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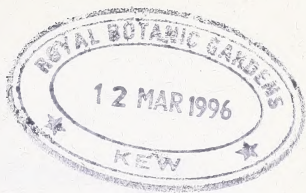
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#### COVER PHOTOGRAPH

*Erica kogelbergensis* is a showy species, occurring on the southern slopes of Kogelberg Peak only 80 km southeast of Cape Town. [E.G.H. Oliver]



*Yb. Heather Soc.* 1996: 1-5.

## **Studies in the Ericaceae (Ericoideae), XX. A rare new species of *Erica* from South Africa.**

**E. G. H. OLIVER & I. M. OLIVER**

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CLAREMONT 7735, South Africa.

*Erica kogelbergensis* is a showy species, very restricted in its distribution occurring only on the southern slopes of Kogelberg Peak and the adjacent ridges and lesser peaks to the east and southwest, only 80 km southeast of Cape Town. There it is confined to moist, peaty areas that receive a considerable amount of moisture, not only during the rainy winters but also from the frequent clouds that are swept over the summit slopes by the southeast winds during the dry summers. This mountain is situated within the area of highest diversity of species for the Cape flora as a whole and for *Erica*. There are about 175 species of *Erica* in this area (Oliver *et al.* 1983). Another restricted endemic on this peak is the well known, yellow-flowered *E. pageana* (see *Yearbook of the Heather Society* 1995) which, however, flowers in October.

### **History**

There has been some confusion with material of this species in herbaria. *Erica serratifolia* was described and figured by Andrews in 1798 from material of unknown origin growing in London. Like many of the cultivated specimens illustrated by him, this entity is difficult to place in any of the currently accepted species known from wild populations. In these cases I have to regard them as being of hybrid origin raised in a garden. The unappendaged anthers, long lateral flowering branchlets, smooth corolla and serrate leaves clearly do not fit the wild populations of *E. kogelbergensis*. Bolus placed his variety under Andrews' name, but did remark that the latter was known only from garden specimens. Andrews' *E. serratifolia* apparently flowered in spring whereas *E. kogelbergensis* is autumn-flowering.



Fig. 1. *Erica kogelbergensis*: yellow form



Fig. 2. *Erica kogelbergensis*: bicoloured form

The early collections in herbaria (including the types) were obtained from flower sellers in Cape Town with consequent lack of, or incorrect, locality data. However, one from 1936 was said to have come from the mountains between Steenbrass and Kogel Bay, which is reasonably accurate.

*Erica kogelbergensis* is related to the group of tubular-flowered species that have 4-nate leaves, hairy corollas and anthers with very small appendages; *E. perspicua* Wendl., *E. macowanii* Cufino, *E. leucotrachela* H. A. Bak., *E. colorans* Andr. and *E. bibax* Salisb. The first three have rather coarser and longer hairs on the corolla and *E. colorans* is a lowland species from the Bredasdorp region with white to pink flowers. *E. bibax* occurs on the middle northern slopes of the Kogelberg complex and is probably the closest allied species. However, it is a more delicate species producing long slender branches with narrower, soft leaves and flowers which are pale yellow, sometimes tinged orange, with white lobes. It grows alongside streams.

There are two colour forms which appear to coexist in some populations, the pure yellow form and the bicoloured orange and



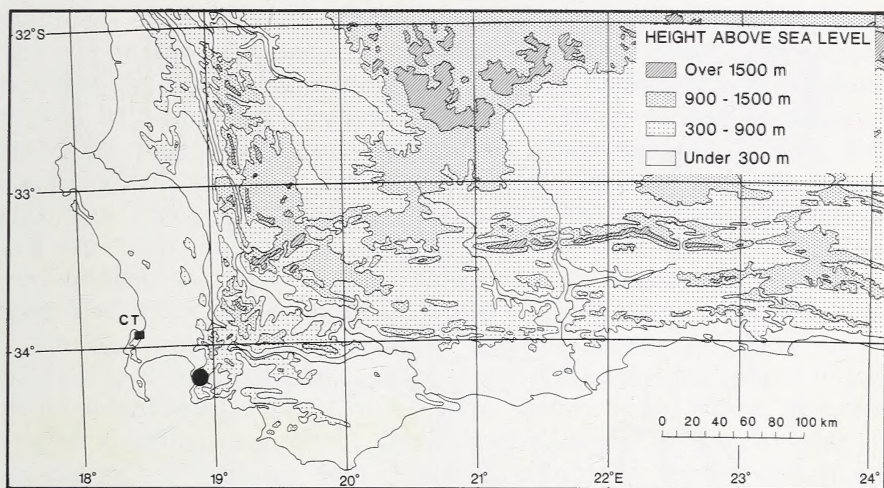


Fig. 3. Distribution of *Erica kogelbergensis* in Western Cape [CT=Cape Town]

yellow form. It is not possible to ascertain which colour form the type exhibited. These colours, coupled with the long tubular flowers, suggest pollination by birds, perhaps the small orange-breasted sunbirds which occur in the area (Rebello *et al.* 1985).

*Erica kogelbergensis* E. G. H. Oliver **stat. & nom. nov.** (§ *Evanthe*)

*Erica serratifolia* Andrews var. *subnuda* H. Bolus, *Transactions of the Royal Society of South Africa* **1** (1909): 158.

*Shrub* erect up to 1.5 m tall, single-stemmed reseeder. *Branches* erect, internodes  $\pm 2$  mm long, puberulous with spreading hairs becoming glabrous, no infrafoliar ridges. *Leaves* 4–6-nate, semi-erect, 0.6–0.8 x 0.1 mm, linear, adaxial surface flat, abaxial surface rounded and narrow-sulcate, glabrous, the younger sparsely ciliolate; petiole appressed, 0.1 mm long, sparsely and shortly ciliate. *Inflorescence* with 1–4-nate flowers in 1 whorl at ends of 5 mm long lateral branchlets forming a dense pseudospike about 40–100 mm long towards ends of main branches; pedicel 0.2 mm long, pubescent; pherophyll partially recaulescent in middle position, 0.2 mm long, ovate-acute, glabrous, ciliolate, yellow-orange; bracteoles 2 just above pherophyll, 0.18 mm long, otherwise same as pherophyll. *Calyx* 4-partite, appressed to corolla; segments 0.6 x 0.2 mm, ovate-acute,



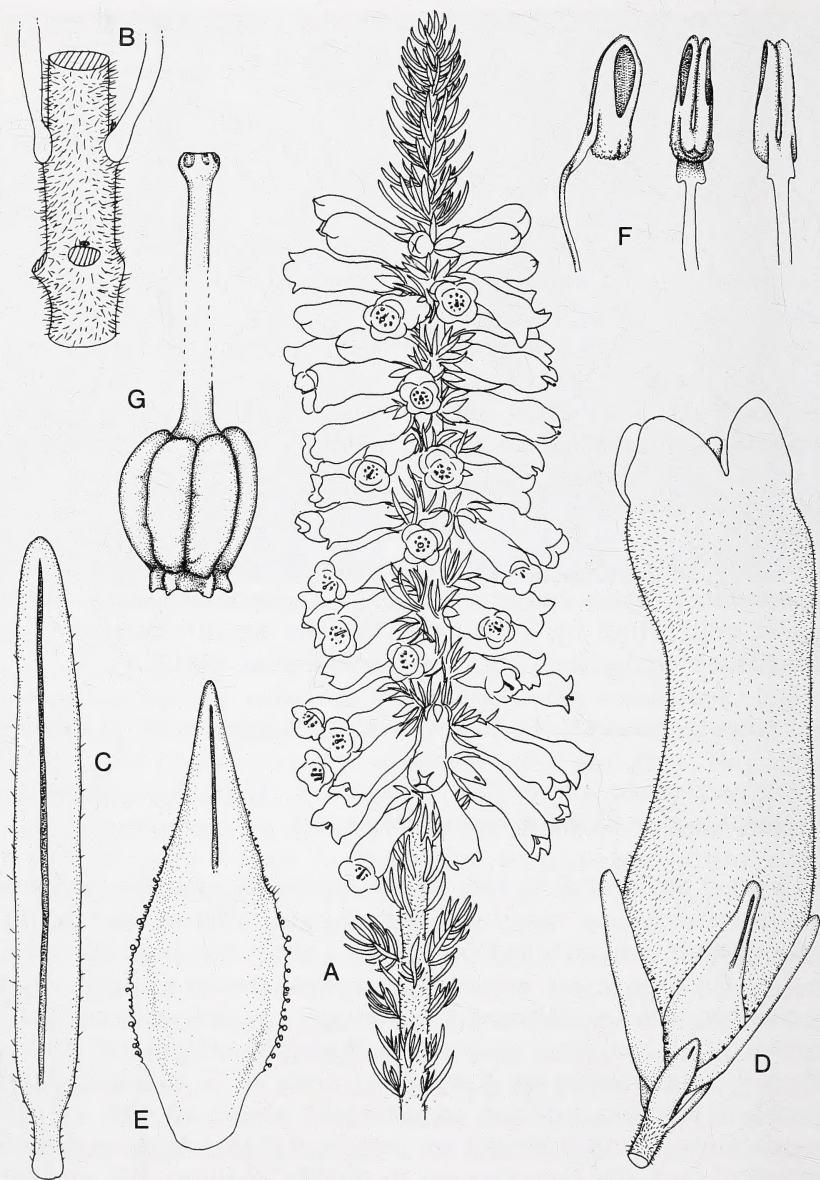


Fig. 4. *Erica kogelbergensis*. A, flowering branch, natural size; B, branch with some leaves removed, x12; C, leaf, x12; D, flower, x6; E, sepal, x12; F, anther, side, front and back views, x12; G, ovary with stigma above (right), x12; [del. Inge Oliver].

glabrous, edged with a few short hairs and sessile non-sticky glands, apically narrow-sulcate, yellow-orange. *Corolla* 4-lobed,  $\pm 15$  mm long, tubular, inflated below the mouth, finely puberulous, completely yellow, or orange with yellow; lobes erect to spreading, subacute to rounded, incurved when old, mostly glabrous. *Stamens* 8, free, included; filaments 8 mm long, slightly curved at apex, linear, glabrous, orange; anthers dorsifixed near base, appendiculate; thecae 1.5 mm long, oblong-obovate, aculeate at base and apex, brown; appendages shortly decurrent along apex of filament; pore half the length of theca; pollen shed in tetrads. *Ovary* 4-(5-6)-locular, 2.0 x 1.8 mm, broad-ellipsoid, 8-lobed, subemarginate, glabrous; ovules  $\pm 28$  per locule, spreading to pendulous; placenta < the length of axis; nectaries present around base; style 13 mm long, terete, glabrous; stigma manifest, capitellate. *Capsule* with valves splitting to base and spreading  $\pm 30^\circ$ , orange, septa free from columella; seeds ovoid, deeply reticulate, pale orange-pink. (Cover photograph & Figs. 1-4)

Lectotypus: **SOUTH AFRICA**. Cape Colony, Caledon Division, mountains between Caledon and Hermanus, May, [near Hermanuspetersfontein, bought fresh in Cape Town, 2 May 1908] *N. S. Pillans 1334* **BOL!** (selected here); **isolectotypi** **NBG!**, **PRE**, **SAM!**. Syntypus: **SOUTH AFRICA**. Cape Colony, Caledon Division, mountains between Caledon and Hermanus, fl. Sept. [bought in Cape Town, Sept. 1906], *N. S. Pillans 228* **BOL!** Other specimens. **SOUTH AFRICA**. Western Cape. **3418**: (-**BB**), Kogelberg, upper SW slopes, 1250 m, 21 April 1970, *Boucher 1240* (**NBG**); *ibid.*, *Esterhuysen sub Baker 2638* (**NBG**); *ibid.*, S slopes, 762 m, 4 May 1989, *Kirsten 1192* (**NBG**); *ibid.*, *le Maître 403* (**NBG**); *ibid.*, upper S slopes, 1150 m, 26 May 1989, *Oliver 9137*, bicoloured form, (**BM**, **K**, **MO**, **NBG**, **PRE**) & *9137a*, yellow form, (**NBG**, **PRE**); *ibid.*, ridge S of Kogelberg, E slopes, 9 May 1966, *Powrie 3* (**BOL**); *ibid.*, May 1939, *Stokoe 7158* (**BOL**, **K**); Spinnekopsnes Range, steep S slopes near summit, 670 m, 8 July 1970, *Boucher 1330* (**K**, **NBG**); Koedoeberg, just below summit, S side, 860 m, 15 February 1973, *Boucher 2114* (**NBG**); *ibid.*, 13 September 1969, *Vogelpoel sub Baker 2971* (**BM**, **NBG** +2).

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## The position of *Bruckenthalia* versus *Erica*.

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During a revision of the genera of the subfamily Ericoideae (the true heaths and heathers) in Africa, I was obliged to look at the two monotypic genera in Europe, *Calluna* and *Bruckenthalia* to assess their positions. *Calluna* is clearly a distinct and enigmatic genus that has numerous characters not shared by any other ericoids. However, there was a problem with the second genus.

*Bruckenthalia* is currently separated from *Erica* species in Europe by having no bracteoles on the pedicel and a partially fused calyx. This holds true for European ericoids but not for the African species. A close investigation reveals that the two bracteoles are not lacking, but are fully recaulescent and actually the two lateral sepals. This situation occurs in some 100 species in Africa, mainly the wind-pollinated species which also have partially fused calyces.

The only unique character which *Bruckenthalia* possesses is its chromosome complement of  $n=18$  as opposed to  $n=12$  in *Erica* and allies and  $n=8$  in *Calluna*. With only 30 or so of the 860 ericoids having been counted so far, the chromosome complement is a rather poor character to use to uphold the genus.

In a generic revision of the Ericoideae to be published later this year, I will be reducing *Bruckenthalia* to synonymy under *Erica*, in which genus it was originally described by Salisbury in 1802 before Reichenbach erected *Bruckenthalia* for it in 1831. There is thus no need for any new combination and the species should be referred to as *Erica spiculifolia* Salisb.



## Threatened Ericaceae in southern Africa.

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Southern Africa, with more than 750 species of Ericaceae, is a major centre of diversity for the family and certainly the global centre for the subfamily Ericoideae (Oliver 1991). This diversity is not evenly distributed over the entire sub-continent, but is instead concentrated at the southern tip in the Cape Floral Region (Goldblatt 1978). More than 620 species of *Erica* and perhaps 96 species in the other minor genera are known to occur in the Cape Floral Region (Oliver 1991; Schumann *et al.* 1992). The Ericaceae are important constituents of both the fynbos and renosterveld vegetation types which are characteristic of the region. Many species of Ericaceae are fairly widespread within the Cape Floral Region, whereas others that are more restricted are often locally dominant, but the majority of species tend to be restricted habitat specialists and generally occur in small numbers. It is hardly surprising, therefore, given the enormous land transformations that have taken place since European settlers first colonised the Cape, to find that a large number of species of Ericaceae are threatened with extinction.

Hall *et al.* (1980) listed 92 taxa (species, subspecies and varieties) of Ericaceae in the southern African *Red data book*, five of which were considered to be extinct. Hall & Veldhuis (1985) listed 134 taxa of Ericaceae as threatened and an additional five as extinct in the Fynbos Biome (an area roughly equivalent to the Cape Floral Region). One of the extinct species (*Erica bolusiaae*) listed in Hall *et al.* (1980) had been rediscovered, but the number of extinctions remained the same in Hall & Veldhuis (1985) because *E. jasminiflora* had become extinct and was added to the list (see below).

Since the last *Red data book* was published, a number of new species have been described and there have been many taxonomic and nomenclatural changes as a result of the systematic work being done by Ted Oliver, particularly on the minor genera (Oliver 1991).

Since 1985 there has also been considerable expansion of urban areas, extensive coastal developments, the ploughing of new land for agricultural crops and numerous other land transformations which have resulted in many more species becoming threatened with extinction. A new *Red data book* for the Fynbos Biome is long overdue and as a precursor to such a work, all the available information on threatened species in southern Africa (i.e. the area south of the Kunene and Limpopo Rivers) has been placed in a database developed at the National Botanical Institute, Kirstenbosch. This database is updated on a regular basis as new information is received. A summary of the information held in this database will be published shortly (Hilton-Taylor in prep.). For this paper, I have extracted the current information on the threatened Ericaceae from the database and a summary of the results is presented in Table 1, with a brief discussion of the major threats. The conservation status of southern African Ericaceae is further illustrated by two case-studies.

From Table 1 it is apparent that approximately 22% of southern Africa's Ericaceae species are under threat of extinction. Five of the threatened taxa are already extinct; one of these, *E. velitaris*, is a recent addition to the list, whereas *E. jasminiflora* was down-listed following its rediscovery (see below). In addition four of the species listed as indeterminate are also possibly extinct. Forty four taxa (6% of all taxa) are in imminent danger of extinction as they are listed under the endangered and vulnerable categories and this figure would probably be considerably higher if all the taxa in the indeterminate and insufficiently known categories were adequately investigated. The large number of taxa in the rare category on the other hand is not a true reflection of their threatened status. Many of these rare taxa are highly restricted endemics occurring on mountain tops, a habitat which is generally not threatened at present. If these taxa were evaluated using the recently proposed IUCN Red Data criteria and categories (IUCN 1994), they would probably be placed into one of the low risk categories.

Comparing the data used for Table 1 with that contained in Hall *et al.* (1980) and Hall & Veldhuis (1985) it appears that 19 taxa have had their conservation status upgraded (i.e. they were placed in a higher category of threat) whereas only six taxa were downgraded. One of those downgraded, *E. cerviciflora*, is not now considered to

be threatened because it was sunk into synonymy under the common *E. grandiflora*. Two species previously listed, *E. dilatata* and *E. praenitens*, have been removed from the list as they are no longer considered to be valid species (E. G. H. Oliver pers. comm.). Taking into account the removals and additions to the list, this means that 30 taxa have been added to the list since the last *Red data book* by Hall & Veldhuis (1985).

It is important to note that Table 1 does not imply that the remaining 78% of Ericaceae species are all not threatened. The conservation status of many of these species, particularly those which are poorly known, has not as yet been adequately evaluated. There are also a number of new species which will have to be added to the threatened list once they are formally described. Some of these are fairly well known and they have therefore been included in the attached list.

As many of the Ericaceae are local endemic species they easily become threatened by extensive resource exploitation and major disturbances to their habitats. The nature and extent of the threats to the Ericaceae have not been fully documented. Table 2, which is derived from information in the database, provides some indication of the nature of the major threats and the number of species affected by these threats. Many of the taxa are affected by more than one threat and these may have a serious cumulative effect on biological factors such as genetic decline (included here) which push species to extinction.

The four threats with the greatest impact on the Ericaceae in the Cape Floral Region are

- (i) invasion of natural vegetation by alien plants, particularly by species of Australian *Acacia* and *Hakea* and by the cluster pine, *Pinus pinaster*, from southern Europe;
- (ii) the replacement of natural vegetation by agricultural crops especially cereals and fruits, pasture species and by ruderals;
- (iii) rapid urban expansion and building activities in areas of high species diversity and endemism; and
- (iv) the increase in the number of accidental and uncontrolled fires has resulted in a fire frequency far greater than many species can survive; many of these fires also occur at incorrect times in terms of the species' biological cycle.





Fig. 1. *Erica jasminiflora*



Fig. 2. *Erica verticillata*

In the eastern montane grasslands of southern Africa, the few *Erica* species present (six threatened taxa in KwaZulu-Natal, four in the Eastern Transvaal and two in Swaziland) are largely threatened by afforestation with commercial timber species.

### Case studies

#### 1. *Erica jasminiflora* Salisb.

As its name indicates this is an extremely attractive species with flowers resembling those of jasmine. It was at one time probably fairly common in the area around Caledon, although only two populations have ever been recorded. Francis Masson was one of the first to collect this species and plants were cultivated in England as early as 1796 from seed which he had collected. The population from which Masson collected the seed is now extinct as a result of agricultural activities, particularly the cultivation of wheat. The remaining population on Shaw's Pass was monitored for a number of years as it declined from 150 plants in 1977 to 50 in 1981, 15 in 1982, eleven in 1983, one in 1984 and the sole survivor was reported as dead in early 1985 (Hall & Veldhuis 1985). The construction of a

road destroyed part of the population and the use of fire to create grazing for sheep in the adjacent farming areas resulted in the demise of plants as the fire invariably spread into the population. The area was fenced off to protect the species from grazing animals and attempts were made to restore and extend the population by burning and re-seeding the area in 1978, but these efforts were apparently unsuccessful. The species was thought to be extinct until after the area was accidentally burnt in the late 1980s and a number of seedlings appeared many of which grew to maturity, flowered and presumably set seed. There has been a subsequent fire and once again it was feared that the species was extinct, but strong regeneration has allayed those fears. The remaining population, confined to an area of less than one hectare, is very small and numbers probably less than 100 plants, but the species is very difficult to find when not in flower.

The land on which the population occurs belongs to the Caledon Divisional Council and for a number of years they leased the site to Cape Nature Conservation. In 1992, Cape Nature Conservation decided not to renew the lease of the land, and the area was then leased to a local school teacher who intended developing part of the site as an outdoor school camp. When these plans became known, the South African Botanical Society and Caledon Wildflower Society lobbied the Caledon Divisional Council, Cape Nature Conservation and the Department of Agriculture about the conservation importance of the site (an endangered species of Proteaceae, *Leucadendron cryptocephalum* L. Guthrie, also occurs in the area). It was recently resolved that Cape Nature Conservation will purchase the land and manage it as a nature reserve.

Although the future of *E. jasminiflora* seems more secure, it may well be too late to save this species from extinction. The population is surrounded by farmland, frequently burnt vegetation and roads and as a result may have become isolated from its pollinators and could thus be regarded as non-viable. It has also been suggested that the failure of a mycorrhizal associate may also be a factor in the survival of this species (Hall & Veldhuis 1985). To add to its problems, it is also very difficult to germinate seed of this species and even if successful, it is difficult to maintain this species in cultivation and the last plant in cultivation at the Kirstenbosch National Botanical Garden died recently. Some seed of this species is preserved in seed banks, but the continued existence of *E. jasminiflora* is uncertain.

## **2. *Erica verticillata* P. J. Bergius**

This is also a beautiful species that was once common on the damp sandy flats south of Cape Town. This handsome plant was regularly sold as a cut flower until 1948 after which samples dwindled rapidly as its natural habitat was replaced by urban development and market gardens. Today the area where *E. verticillata* once occurred is all urban sprawl. Fortunately plants of this species have been maintained in cultivation in a number of botanic gardens around the world including Kew, Edinburgh, Berlin-Dahlem, St Petersburg (Leningrad), Belvedere Palace in Vienna, Tresco in the Isles of Scilly and Villa Taranto near Lake Maggiore in Italy. In South Africa, the plant was thought to be totally extinct, until plants were discovered growing in Protea Park (also known as Jan Cilliers Park), an indigenous garden in Pretoria. Cuttings were made and taken to Kirstenbosch where they were successfully propagated. Additional cuttings were also obtained from Kew so as to increase the genetic stock.

*Erica verticillata* is extremely easy to cultivate both from cuttings and seed, and due to a successful propagation campaign at Kirstenbosch, plants are now readily available to the public. A local school whose school badge was designed after this species 40 years ago, recently decided to plant specimens of *E. verticillata* back on the school property, where it was formerly so abundant. A number of plants have also been planted at the Rondevlei Nature Reserve in very similar habitats to that in which they would originally have occurred. Reports indicate that these reintroductions have been fairly successful as they all survived their first dry summer and some of the plants have already started flowering.

## **Conclusion**

These case-studies illustrate that although extinct in the wild, a species is not entirely lost provided enough material from different genetic stock is maintained in cultivation. Also, if suitable sites can be found, there is potential for reintroduction back into the wild even though it may only be in a highly managed situation. However, we cannot afford to be complacent and rely on the efforts of *ex situ* conservation to save all the Ericaceae threatened with extinction. Our botanical gardens have very limited resources and they cannot grow the increasing number of species listed as threatened. Many



of these threatened species are also extremely difficult to maintain in cultivation as is demonstrated by *E. jasminiflora*. *In situ* conservation efforts are therefore vital if we are to preserve the diversity of Ericaceae in southern Africa. These conservation efforts must take into account the biology of the species concerned and must also not be implemented too late as may well be the case for *E. jasminiflora*.

### Acknowledgements

I am extremely grateful to Ted Oliver for patiently answering numerous enquiries about the Ericaceae and their conservation and taxonomic status. Much of the information presented here is the result of many years of research by Ted Oliver. I also wish to thank many other people who contributed information on the Ericaceae, but as they are too numerous to mention here, I would refer readers to Hilton-Taylor (in prep.) for a full list. Dave McDonald gave valuable comments on an earlier draft of this manuscript. Deon Kotze who also provided additional information, must be thanked in particular for the sterling work he does in maintaining the extremely valuable collection of threatened Ericaceae at the Kirstenbosch National Botanical Garden.

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GENUS	CONSERVATION STATUS						TOTAL
	EX	E	V	R	I	K	
<i>Acrostemon</i>				1	1		2
<i>Coilostigma</i>					1		1
<i>Eremia</i>				1			1
<i>Eremiella</i>				1			1
<i>Erica</i>	5	21	20	55	13	33	147
<i>Grisebachia</i>			1		10		11
<i>Platycalyx</i>			1				1
<i>Scyphogyne</i>					1		1
<i>Syndesmanthus</i>			1				1
TOTAL	5	21	23	58	26	33	166

Table 1. Numbers of threatened Ericaceae taxa recorded for each genus in southern Africa according to conservation status categories defined in Davis *et al.* (1986). EX = extinct, E = endangered, V = vulnerable, R = rare, I = indeterminate, K = insufficiently known.

THREATS	TAXA AFFECTED	
	No.	%
Invasive alien plants	33	37
Agriculture (ploughing)	31	34
Urban development	28	31
Uncontrolled fires	20	22
Afforestation with alien trees	10	5
Presumed genetic decline	6	7
Grazing and browsing	5	5
Trampling	5	5
Quarrying and roads	4	4
Commercial flower picking	3	3
Flooding of valley bottoms by dams	2	2

Table 2. Summary of threats affecting 90 of the threatened Ericaceae taxa in southern Africa.

## Appendix

List of threatened Ericaceae taxa in southern Africa, with their conservation status (right column) indicated by the standard abbreviations used for the IUCN Red Data categories (Davis *et al.* 1986). EX = extinct, E = endangered, V = Vulnerable, R = rare, I = indeterminate and K = insufficiently known.

### TAXON NAME

<b>Acrostemon xeranthemifolius</b>		<i>Erica chrysocodon</i> Guthrie & Bolus	E
(Salisb.) Oliv.	I	<i>Erica claviseipala</i> Guthrie & Bolus	R
<i>Acrostemon</i> sp. nov.		<i>Erica comptonii</i> Salter	R
("vernicosus" Oliver 8514)	R	<i>Erica cremea</i> Dulfer	R
<b>Coilostigma zeyherianum</b> Klotzsch		<i>Erica crucistigmatica</i> Dulfer	E
var. <i>tenuifolium</i> (Klotzsch) Oliv.	I	<i>Erica cryptanthera</i> Guthrie & Bolus	K
<b>Eremia brevifolia</b> Benth.	R	<i>Erica cyrilliflora</i> Salisb.	V
<b>Eremiella outeniquae</b> Compton	R	<i>Erica diotiflora</i> Salisb.	R
<b>Erica abbottii</b> Oliv.	V	<i>Erica dysantha</i> Benth.	I
<i>Erica abelii</i> Oliv.	V	<i>Erica eburnea</i> Salter	R
<i>Erica abietina</i> L.		<i>Erica eriophoros</i> Guthrie & Bolus	K
var. <i>echiiflora</i> (Andrews) Dulfer	R	<i>Erica etheliae</i> L.Bolus	K
<i>Erica aghillana</i> Guthrie & Bolus		<i>Erica fairii</i> Bolus	E
var. <i>aghillana</i>	V	<i>Erica ferrea</i> P.J.Bergius	V
<i>Erica alexandri</i> Guthrie & Bolus		<i>Erica fervida</i> L.Bolus	K
ssp. <i>alexandri</i>	E	<i>Erica flanagani</i> Bolus	I
ssp. <i>acockii</i> (Compton) Oliv.	EX	<i>Erica fontana</i> L.Bolus	R
<i>Erica alfredii</i> Guthrie & Bolus	R	<i>Erica galkebergensis</i> H.A.Baker	R
<i>Erica amoena</i> J.C.Wendl.	R	<i>Erica gallorum</i> L.Bolus	K
<i>Erica aneimensa</i> Dulfer	V	<i>Erica gossypoides</i> Oliv.	I
<i>Erica annectens</i> Guthrie & Bolus	R	<i>Erica gracilipes</i> Guthrie & Bolus	I
<i>Erica anomala</i> Hilliard & B.L.Burt	R	<i>Erica granulatifolia</i> H.A.Baker	R
<i>Erica aspalathoides</i> Guthrie		<i>Erica greyi</i> Guthrie & Bolus	K
& Bolus	K	<i>Erica heleogena</i> Salter	E
<i>Erica atrovinosa</i> Oliv.	E	<i>Erica heliophila</i> Guthrie & Bolus	K
<i>Erica bakeri</i> Salter	E	<i>Erica hendricksei</i> H.A.Baker	
<i>Erica barrydalensis</i> L.Bolus	R	var. <i>hendricksei</i>	R
<i>Erica bauera</i> Andrews	V	<i>Erica heterophylla</i> Guthrie & Bolus	K
<i>Erica beatricis</i> Compton	R	<i>Erica hibernia</i> Andrews	V
<i>Erica berzeloides</i> Guthrie & Bolus	K	<i>Erica hillburtii</i> (Oliv.) Oliv.	R
<i>Erica blanchiana</i> L.Bolus	R	<i>Erica hippurus</i> Compton	R
<i>Erica blesbergensis</i> H.A.Baker	R	<i>Erica holtii</i> Schweick.	R
<i>Erica bolusiae</i> Salter var. <i>bolusiae</i>	E	<i>Erica humansdorpensis</i> Compton	K
<i>Erica brachycentra</i> Benth.	I	<i>Erica inamoena</i> Dulfer	K
<i>Erica brachyseipala</i> Guthrie & Bolus	V	<i>Erica inordinata</i> H.A.Baker	R
<i>Erica caledonica</i> A.Spreng.	R	<i>Erica insignis</i> Oliv.	R
<i>Erica capensis</i> Salter	R	<i>Erica insolitanthera</i> H.A.Baker	R
<i>Erica capitata</i> L.	R	<i>Erica intricata</i> H.A.Baker	R
<i>Erica casta</i> Guthrie & Bolus		<i>Erica jasmiflora</i> Salisb.	E
var. <i>casta</i>	V	<i>Erica junonia</i> Bolus var. <i>junonia</i>	E
<i>Erica caterviflora</i> Salisb.	E	<i>Erica keeromsbergensis</i> H.A.Baker	R
<i>Erica chloroseipala</i> Benth.	R	<i>Erica keetii</i> L.Bolus	K



<i>Erica kraussiana</i> Klotzsch	K	<i>Erica sonora</i> Compton	R
<i>Erica lageniformis</i> Salisb.	I	<i>Erica stylaris</i> Spreng.	K
<i>Erica latifolia</i> Andrews	K	<i>Erica subverticillaris</i> Guthrie	
<i>Erica lehmannii</i> Klotzsch ex Benth.	K	& Bolus	R
<i>Erica lerouxiae</i> Bolus	V	<i>Erica swaziensis</i> Oliv.	V
<i>Erica leucosiphon</i> L. Bolus	R	<i>Erica toringbergensis</i> H.A. Baker	R
<i>Erica limosa</i> L. Bolus	V	<i>Erica trachysantha</i> Bolus	K
<i>Erica lowryensis</i> Bolus		<i>Erica trichophora</i> Benth.	K
var. <i>lowryensis</i>	R	<i>Erica trichophylla</i> Benth.	K
<i>Erica macilenta</i> Guthrie & Bolus	K	<i>Erica turbiniflora</i> Salisb.	
<i>Erica margaritacea</i> Sol.	E	var. <i>turbiniflora</i>	I
<i>Erica marifolia</i> Sol.	R	<i>Erica turgida</i> Salisb.	EX
<i>Erica mundii</i> Guthrie & Bolus	K	<i>Erica turrisburyonica</i> H.A. Baker	K
<i>Erica nana</i> Salisb.	R	<i>Erica umbonata</i> Compton	K
<i>Erica nematophylla</i> Guthrie	R	<i>Erica urna-viridis</i> Bolus	R
& Bolus		<i>Erica ustulescens</i> Guthrie & Bolus	I
<i>Erica obconica</i> H.A. Baker	K	<i>Erica uysii</i> H.A. Baker	V
<i>Erica oblongiflora</i> Benth.	R	<i>Erica valida</i> H.A. Baker	R
<i>Erica occulta</i> Oliv.	R	<i>Erica vallis-araneorum</i> Oliv.	R
<i>Erica octonaria</i> L. Bolus	K	<i>Erica velitaris</i> Salisb.	EX
<i>Erica oligantha</i> Guthrie & Bolus	I	<i>Erica verticillata</i> P.J. Bergius	EX
<i>Erica oophylla</i> Benth.	R	<i>Erica vestiflua</i> Salisb.	R
<i>Erica ostiaria</i> Compton	R	<i>Erica vogelpoelii</i> H.A. Baker	I
<i>Erica oxyandra</i> Guthrie & Bolus	K	<i>Erica wyliei</i> Bolus	R
<i>Erica paludicola</i> L. Bolus	V	<i>Erica xanthina</i> Guthrie & Bolus	K
<i>Erica parvulisepala</i> H.A. Baker	R	<i>Erica zebrensis</i> Compton	K
<i>Erica passerinoides</i> (Bolus) Oliv.	I	<i>Erica zitzikammensis</i> Dulfer	R
<i>Erica patersonia</i> Andrews	R	<i>Erica zwartbergensis</i> Bolus	K
<i>Erica pauciovulata</i> H.A. Baker	R	<i>Erica</i> spp. nov.	
<i>Erica pearsoniana</i> L. Bolus	K	("cabernetoides" Oliver 3187)	E
<i>Erica physantha</i> Benth.	E	("flexistyla" Oliver 10558)	E
<i>Erica pillansii</i> Bolus	V	(Burgers 2598)	E
<i>Erica pilulifera</i> L.	E	(Burgers 352)	E
<i>Erica porteri</i> Compton	V	<b><i>Grisebachia ciliaris</i></b> (L.f.) Klotzsch	
<i>Erica propendens</i> Andrews	R	ssp. <i>bolusii</i> (N.E.Br.) Oliv.	I
<i>Erica pulvinata</i> Guthrie & Bolus	R	ssp. <i>involuta</i> (Klotzsch) Oliv.	I
<i>Erica purgatoriensis</i> H.A. Baker	V	<i>Grisebachia incana</i> (Bartl.) Klotzsch	I
<i>Erica pyramidalis</i> Sol.	EX	<i>Grisebachia minutiflora</i> N.E.Br.	
<i>Erica pyrantha</i> Bolus	K	ssp. <i>nodiflora</i> (N.E.Br.) Oliv.	I
<i>Erica quadrisulcata</i> L. Bolus	V	<i>Grisebachia nivenii</i> N.E.Br.	I
<i>Erica regia</i> Bartl.		<i>Grisebachia plumosa</i> Klotzsch	
var. <i>variegata</i> Bolus	V	ssp. <i>eciliata</i> Oliv.	I
<i>Erica revoluta</i> (Bolus) L.E. Davidson	R	ssp. <i>hirta</i> (Klotzsch) Oliv.	I
<i>Erica rhodopis</i> Bolus	E	ssp. <i>hispida</i> (Klotzsch) Oliv.	I
<i>Erica riparia</i> H.A. Baker	I	ssp. <i>irrorata</i> (Klotzsch) Oliv.	I
<i>Erica rivularis</i> L.E. Davidson	I	<i>Grisebachia rigida</i> N.E.Br.	V
<i>Erica rufescens</i> Klotzsch	K	<i>Grisebachia secundiflora</i> Oliv.	I
<i>Erica sacciflora</i> Salisb.	E	<b><i>Platycahyx pumila</i></b> N.E.Br.	V
<i>Erica shannonea</i> Andrews	R	<b><i>Scyphogyne calcicola</i></b> Oliv.	I
<i>Erica sociorum</i> L. Bolus	E	<b><i>Syndesmanthus schlechteri</i></b> N.E.Br.	V

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## Growing heathers in Western Massachusetts.

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My main love is alpine – the kind one insensitive visitor dismissed with a shrug: That little thing! So heathers have to be considered an ‘extra’. I share a five or six acre garden in the Berkshire hills of western Massachusetts. The soil is acid sand and very rocky, being residual detritus from a long vanished glacier. It sounds completely appropriate for heathers and it is, except that the winters are hard. This limits the number of species we can grow and even puts a restriction on the many varieties of *Calluna vulgaris* and *Erica carnea* which in general we *can* grow. Besides alpine scree and raised beds there are perennial borders and woodland gardens but heathers don’t really fit easily into any of these locations. So what does one do with them?

One solution is that Wisley idea with heathers segregated into beds laid out in drifts of contrasting colors. My feeling about this is that it has been done many times – why repeat it? But Norman, who is the other gardener, has tried his hand at massing groups of the same variety to give a patchwork of harmonious colors. It always looks very well but gradually through a series of disconnected events the original intent of the bed is subverted:

**1.** A group of the same variety of *Calluna* succumbs to a really bad winter (or a really bad April). This leaves a gap which it is impossible to fill. Baby heathers look ridiculous promising to fill the gap in five or six years. Full grown heathers would be hard to cram into the rooty soil and would always look like intruders.

**2.** Crab grass (couch?) creeps in from the lawn (read meadow) and infests one of the interior inaccessible plants. Result: it has to be dug up in order to weed it properly.

If either **1** or **2** occurs one decides to redesign the bed into a mostly-heather garden and plant a few lavenders or *Perovskia atriplicifolia*.

**3.** Two or three dwarf conifers originally planted between the heathers for contrast suddenly shoot upwards and outwards overwhelming their neighbours with pushy branches and unwanted shade. In this case it is probably better to let the closest plants quietly die or do some discreet pruning to get rid of the distressed side of the plant.

Anyway I'm not sure I really like the original formula enough to grieve over the demise of what after all was somebody else's idea. I do like heathers though, so I plant them virtually anywhere: raised beds, perennial borders, with bulbs and thymes, with large mats of *Phlox subulata* or even with arabis, alyssum and arenaria. They look particularly good as single plants. First they act as fillers, their solid bushy mounds acting as background colour of greys and shiny greens or bronzes and muted yellows. Then when they bloom they take over from their short season neighbours. If everything blooms together so much the better, colour clashes in a garden are as invigorating as the clash of cymbals in the orchestra.

I like to 'look at' as many different plants as I can grow from seed or find in catalogues. So when I buy heathers it is usually a dozen or so different cultivars. It wouldn't do to have all of them planted close together in one bed. When you get a new small plant in a three inch pot, you don't know the flower and foliage colour or its ultimate height and extent, nor do you know the form – its tightness or openness. So every plant is planted in a different part of the garden. They hardly ever look wrong although you may have to move one occasionally if mutual jostling occurs too rapidly. It is a low-risk of enjoying heathers in our climate because losing just one or two individuals is no big deal.

I understand from Charles Nelson that many species are hardy in Ireland, and I have seen for myself that many species survive the equally ghastly climate of the US Northwest (just kidding). We have frequent winter temperatures of  $-10^{\circ}\text{F}$  and sometimes  $-20^{\circ}\text{F}$ . This can be with or without snow, but the garden has so many micro-climates that we have never lost vast quantities of heathers. We now restrict ourselves to the following species: *Calluna vulgaris*, *Erica carnea*, *E. tetralix* and *Bruckenthalia spiculifolia*. We have tried a few other species of *Erica* without success. I *never* shear my plants. They always bloom well enough and some plants grow ever more handsome over ten or more years. The ones that are straggly are



that way from childhood and I accept that as part of their nature. When I need new plants (i.e. when I am forced to move a plant) I cut into pieces and replant the best pieces after cutting back the longest ends. I *never* take cuttings. I am not proud of these admissions but I would like to dispute the common wisdom that insists that these two operations – yearly shearing and propagation by cuttings – are essential. Not true.

Since we have so many heathers and the ‘lawn’ is such a convenient and tempting seeding ground for their seed, we have many self-sown heathers joining the thymes, violets, houstonias, phlox and ajuga running wild. These get mown flat and walked on frequently. It occurs to me that a heather lawn might be quite interesting if it were made deliberately and with careful observation of which cultivars would adapt to such violent treatment. I doubt whether it would be as spectacular as a thyme lawn at its best, but the inevitable bees detract from thyme’s charm. I suppose heathers could bloom very close to the ground, but I have never seen this: usually just an absolutely flat woody mat of neat leaves. I don’t think you could achieve this result by shearing back a fully grown plant and possibly seeding would be the only way. But when I think about the rich beauty of *Erica carnea* ‘Vivellii’, the extravagant golds of a *Calluna* whose label is lost, the comical lumpy form of *C. vulgaris* ‘Humpty Dumpty’ or the sensuous mound of *C. vulgaris* ‘Foxii Nana’, the novelty of a flat heather lawn is not all that attractive except as a curiosity.



[Photo: A.W. Jones]

### ***Erica bocquetii***

Low-growing, hoary shrub with close-packed leaves; leaves 2.0–2.8 mm long, 0.6–0.9 mm broad; flowers pink (H8) in cultivation to heliotrope (H11) in wild, on pedicels 8–12 mm long; stamens 10; ovary with 5 cells.

*Erica bocquetii* is only found in the mountains of southwestern Anatolia, Turkey. It was discovered on 28 April 1968, while not in bloom, by H. Pesmen, at Çiglikara. Pesman described the species and named it *Pentaptera bocquetii* (*Candollea* **23** (1968): 271). Dr Peter Stevens transferred it to *Erica* (*E. bocquetii* (Pesman) P. F. Stevens), in *Flora of Turkey and the East Aegean islands* **6**: 97 (1978). A new population was found by R. M. Burton in 1994.

McClintock and Lupo Osti visited two populations of this rare species in July 1989, and reported finding shrubs growing in crevices on calcareous rocks in clearings within cedar forests, and always in some shade. They gathered cuttings, which arrived in West Camel on 3 August; of the 130 cuttings inserted, 84 rooted.

*Erica bocquetii* first bloomed at Otters' Court, West Camel, Somerset, in late April 1994. It appears to require very sharp drainage but, even given that, it has not grown well here.

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## ***Erica cinerea* ‘Joseph Murphy’**

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Who was Joseph Murphy? Why was a bell heather named after him? So many garden plants are named after individuals, and we are not always made aware of the background of the naming. In some cases the person concerned made an important contribution to heather growing, and in a very modest and unsung way, this is the case with Joseph Murphy.

Joe is an Irishman who, despite his 50 years in England, has never lost his Irish accent or his allegiance to his native town of Bray. He came to England to find work, which he did in the mining industry in Nottinghamshire, and he worked in that industry until it affected his health when he sought casual work as a jobbing gardener. In the late 1960s he knocked at the door of a house in Newstead Abbey Park, Nottinghamshire, seeking work and thereby started a new life working with heathers which lasted until he retired. Once Joe was ‘converted’ from his strong belief that the only way to grow any plant was to use the same methods as the farmer in his home town used to grow his turnips and potatoes, he became the finest potting machine ever invented, potting-up at least 1000 plants every day, in addition to 4000 cuttings per day in the season. When the Javo potting-machine salesman telephoned twice a year on his UK selling tours, he never could understand that Tabramhill Gardens had the best potting machine you could ever wish for, and he had never heard of the Joseph Murphy make. I never found out whether the Javo man ‘clicked’, or understood the English sense of humour. The fact was that Joe rarely, if ever, broke down; he never needed servicing, and he ran on a ‘fuel’ of black tea, bread and butter, and cigarettes.

Joe was the most loyal of men, with a ‘heart of gold’, who was and will always be regarded with great affection by those who worked with him. He convinced us that he really was interested in heathers when in 1972 he returned from one of his rare holidays in his native





Fig. 1 Joseph Murphy at work in Tabramhill Gardens, December 1977.

country with cuttings of two heathers which he had collected on Bray Head, County Wicklow.

*Calluna vulgaris* 'Bray Head' is a compact ling with attractive, coloured spring growth, as on 'Spring Torch' and many others. It has always been a much under-rated cultivar, yet it is free-flowering, has a compact habit and excellent spring foliage colour.

The bell heather (*Erica cinerea*) that Joe collected, and which we named after him, is one of the plants that has a striking fluorescent quality which makes its purple flowers stand out much more than others of similar colour. 'Joseph Murphy' also has a compact habit. It was amusing to see this listed as a 'new' plant in one of the major mail-order catalogues about five years ago. The appearance of his plant in such an eminent catalogue was a tribute to a man who made a substantial contribution to heather production for more than ten years.

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# **The flora and fauna of the North York Moors, and the uses of heather and moorland by mankind.<sup>1</sup>**

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The North York Moors National Park consists of an isolated upland area, significant in that it is the most easterly upland area in Britain and has the largest single block of heather-dominated moorland in England and Wales. It has been a national park since 1952 and the primary reason for its designation was the heather moorland. It must be remembered that most (80%) of the land is in private ownership, and the moors are used as private sporting estates where the wild red grouse are the prime quarry.

## **Heath species in the North York Moors**

The different heaths and heathers occupy different niches in the moorland system, but these all occur naturally and have been present to a greater or lesser extent since the last ice age ended 10,000 years ago.

Common heather or ling (*Calluna vulgaris*), found on shallow peat, is the most extensive. Management by burning favours this species as it regenerates well from seed or rootstocks after just the right level of fire. Bell heather (*Erica cinerea*) and cross-leaved heath (*E. tetralix*) are found at opposite extremes of the dry-wet spectrum.

These are not the only heath species which occur. Bilberry (*Vaccinium myrtillus*) cloaks the slopes of the moorland plateau and is also often found under birch and oak woodland as it can tolerate more shade than heather.

Other members of the heath family are far scarcer – cranberry (*Vaccinium oxycoccus*) is only found in a few wet flushes; cowberry (*V. vitis-idaea*) trails over sloping ground; bearberry (*Arctostaphylos uva-ursi*) is also rare and bog rosemary (*Andromeda polifolia*) survives



Fig. 1. View of Lockton High Heath

on one of the few remaining blanket bogs. A plant closely resembling the heath family (Ericaceae), but not a member of it, is crowberry (*Empetrum nigrum*; Empetraceae), often forming dense mats and producing hard, black fruits.

### **Vegetation history**

The plants described above owe their present distribution largely to the activities of mankind, combined with climate change interacting with soils and geology over thousands of years. Their distribution and abundance has changed in that time, and the evidence for this is found in pollen profiles preserved in peat layers that allow a glimpse of conditions in the past. During the last ice age, more than 15,000 years ago, most of the area now occupied by the North York Moors was not covered by glaciers, and the vegetation of the unglaciated areas would have been similar to the tundra now found in the northern countries like Alaska. As the climate warmed and the ice retreated, trees and scrub began to invade and may well have covered the whole area by about 7,500 BC. When humans reached this area about 3,000 BC, the first forest clearances began – for hunting, for firewood and eventually for grazing domestic stock. The moors would probably have been open by the time the Romans came to the area in the first century AD.



Since medieval times the moors have been grazed by domestic stock, preventing re-invasion of scrub and trees (although some woodlands survive in places), and managed by the use of fire. Even so, the moorland is still a semi-natural habitat and provides a haven for many species.

### **Wildlife interest**

For wildlife, the mosaic of heathers provides the following:

- food in the form of nectar, pollen, green shoots and even woody material
- cover and safety from predators
- nesting and breeding areas
- shelter from bad weather – the plants reduce wind speed and often provide conditions of higher humidity than grassland or open ground
- a physical structure for perching on, hunting, or displaying from.

The one species that is most strongly associated with heather is the red grouse (*Lagopus lagopus scoticus*). It eats, nests in and shelters in heather and spends the whole year on the moorland. Virtually all of the other birds that use the moorland ecosystem are migratory and use other habitats during their life cycle. Birds like curlew, golden plover and lapwing are present in summer and all use heather stands of varying heights for nesting in. These species feed on insects that live in the heather litter. The small falcon, the merlin (*Falco columbarius*), also uses heather to nest in, and this bird preys on small birds and even large insects found over moorland.

Many birds are easily seen, but other animals are more secretive, using heather to hide themselves away. Adders (*Vipera berus*) are mostly seen by people who are scared of snakes, but these shy creatures would always try to get away from humans. (It should be noted that adders, along with the birds, are legally protected.) Another reptile that is sometimes seen is the common lizard (*Lacerta vivipara*), but normally just as a flicker of a brown tail disappearing through the heather stems.

The pygmy shrew (*Sorex minutus*) is quite strongly associated with moorland. This miniature carnivore is the size of a 1p coin and yet needs to eat about 100 maggot-sized insects a day to survive.



Fig. 2. Caterpillar of the northern eggar moth (*Lasciocampa quercus* ssp. *callunae*)

Insects form the most diverse part of the heather ecosystem, and could far outweigh the other creatures. There are many attractive species. Butterflies include the green hairstreak (*Callophrys rubi*) whose caterpillars feed on bilberry, the large heath (*Coenonympha tullia*) which feeds on heather nectar (mainly cross-leaved heath which flowers early and is found in the same wet places as the sedges that are the caterpillar's food plants), and the small pearl-bordered fritillary (*Boloria selene*), again obtaining nectar from early flowering heathers.

Moths on moorland can be large and colourful, and the caterpillars of two species are dependent on heather – these are the striking emperor moth (*Saturnia pavonia*), and the northern eggar moth (*Lasciocampa quercus* ssp. *callunae*). Moorland dragonflies use the heather in their territories as perches from which to catch prey, whereas the green tiger beetle (*Cicindela campestris*) utilises the warm sheltered areas between the heather plants to hunt for prey on the ground. Some insects can reach plague proportions – for example the heather beetle (*Lochmaea suturalis*) which can seriously debilitate stands of heather.

The structure of the heather vegetation is vital to encourage biodiversity – human use encourages this but even in 'natural' conditions heather creates its own structure as older plants fall open and layer, creating open areas ready for colonisation by young plants.

## The story of human use

Since humans first colonised the North York Moors they have used the upland areas for hunting, grazing animals and even growing crops. Evidence for this is shown by numerous settlements, field systems and other features, sometimes no more than a bump or hollow in the ground. The heather moors were probably in existence by the time the Romans invaded Britain, but it was not until about 1200 AD that systematic farming began. At this period the wealthy Cistercian monasteries at Rievaulx, Byland and elsewhere, ran flocks of sheep on the moors. It is probably from this time that burning became more regular (although fire had been a management tool since early times). At some point it was recognised that heather sprouts again after burning, providing fresh, young, nutritious shoots for the hardy breeds of sheep. Sheep eat *Calluna vulgaris* in preference to *Erica tetralix* and this often leads to increased dominance of the latter.

Nearly 600 years later, this characteristic of heather was exploited to boost the grouse population. This favoured game bird relies on heather for its survival and management has been developed to cater for its every need. Burning produces the open areas of short, young heather for feeding; heather of medium height is suitable for nesting; and the older, taller heath provides shelter. Increasing the diversity of heather heights will encourage more grouse territories and more birds for the gun.

Of course the property of heather as a fuel has long been recognised by the farming communities. Even in the 1960s old woody stems were collected for fuel, and today the turves (heather root systems) are still cut by a few people – what else can be used in a landscape largely devoid of trees?

In summer the heather moors hum with the sound of bees – some are wild, but most are from hives taken up onto the moor for heather honey, providing humans with a taste of the heather itself long after the flowering season is over. Besoms are another traditional use for heather, using the long stems collected in bundles to form sweeping brushes. Another use of long heather stems was for thatching, sometimes even using plants with the roots still attached and turves on the ridges. This type of thatching is rarely seen today but documentary evidence suggests it was once common in this area. The durability of heather stems also made them valuable for road and track foundations; this use can be traced as far back as Roman times.



Many of these uses are thought of as traditional – others include the use of heather as a herb or tisane, as a dye plant and for tanning. Anyone who has been bilberry picking will appreciate how labour-intensive some of these uses are. Also many of these uses involve skills that are all but lost, and where mechanisation of such tasks is difficult or impossible.

Increasingly, these traditional uses are being combined with ‘modern’ land-use practices that do not specifically use heather but make use of the open landscapes typified by heather moors. These include military training exercises or installations (past and present), water catchment and storage, but also include uses that involve an ‘escape’ from the modern world – outdoor leisure activities like walking, riding or even just appreciating the space and landscape of the moor.

Scientific studies, examining the inter-relationships between heather, soils, water and other plant or animal communities, are leading to a better understanding of an environment that sometimes is taken for granted. These scientific investigations are also developing other uses of heather to solve some modern problems. Among these are the use of cut stems as a bio-filter for water and air; as an alternative horticultural medium to peat; or, even a bio-fuel. Unfortunately in too many cases these heather-dominated areas have not been highly-valued – on a local scale there is so much heather moor that other uses have been implemented, mainly farming or forestry, and these are generally of low productivity. Drainage of the peat moors also causes irreversible hydrological change. Changes in intensity of use can lead to overgrazing and erosion, while far distant industrial activities cause pollution and acid deposition. In the North York Moors direct losses of moorland to other land uses between 1952 and 1983 accounted for 25% of the 1952 area. The impact of pollution, drainage and stocking levels on the remainder is still not fully understood, but it is important that the future of these habitats is secured because Britain holds most of the global resource of heather-dominated plant communities. These are not just closely interwoven with the history and culture of people, but are also vital for the survival of many species of wildlife. Recently these habitats have been officially identified as being important on a European scale – time will tell if the North York Moors achieve formal designation.

### **The National Park Authority's role**

The National Park Authority's role is to develop partnerships with local farmers and landowners, raise awareness among visitors about the importance of traditional land uses, and counter threats to the habitat by developing and implementing strong policies for conservation. Visitors to the North York Moors often do not realise that most of the national park is privately owned. It is important to recognise that the beauty of the wide sweeps of heather is a by-product of centuries of management for farming and game. Scientific study in this century has identified that the habitat supports a wide diversity of plants and animals, even though at first sight it looks somewhat monotonous. Some of this diversity can be attributed to the rotational winter burning in small patches carried out by farmers and keepers. The burning promotes fresh heather growth which is highly nutritious. The resulting variation in structure and openness leads to different microclimatic conditions and other, as yet unknown, factors that suit different kinds of insects and other invertebrates. Different birds also use open or sheltered areas for breeding, depending on their preference. The mosaic or 'patchwork' of heather heights therefore provides a greater diversity of associated species. If this management were stopped, it could have significant consequences. One of these would be the gradual ageing of all the heather. At present there is not enough scientific information to predict what the changes would be if this occurred on a large scale. Studies are needed urgently and in the North York Moors an area of moorland near the famous 'Golf Balls' early warning station of Fylingdales Moor (now demolished and replaced with a single pyramid-shaped radar station) may provide this opportunity. Unmanaged (i.e. no burning and no sheep) since at least the 1960s the heather is still there in almost waist-high stands. Even though adjacent to a forestry plantation, the scrub has not yet taken over. Studies of the growth of these heather plants and how they are surviving need to be carried out as soon as possible. It is known that heather can persist as a result of natural layering of the stems (i.e. rooting where they touch the moist, peaty ground, resulting in rejuvenation of the older plants).

Back on the rest of the Moors, sporting interests usually dominate the management. Grouse cannot be reared in captivity, unlike pheasants, and are a highly sought-after game bird. Grouse

is the species that most people associate with heather moors and the North York Moors support a significant part of the English population.

The future for the moorlands is by no means certain. Sheep farming in the uplands is in a precarious position and there are pressures on the shooting industry. The costs of employing gamekeepers and shepherds to manage the moorland are considerable. Dealing with problems arising from the increasing use of four-wheel drive 'convoys' that churn up access tracks, or from sheep rustling, or the gradual invasion of bracken adds to these costs. There is a need to maintain healthy stocks of both sheep and grouse, and to develop the economic viability of farms and moorland shoots. If this is not done, the continued existence of the heather communities may well depend on public support.

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<sup>1</sup> This paper covers some of the points made at the Heather Society's visit to the North York Moors National Park in early September 1994.



*Yb. Heather Soc.* 1996: 31-35.

## Some bees, wasps and other insects associated with British heathlands.

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Three species of heather are normally associated with British heathlands, *Calluna vulgaris*, *Erica cinerea* and *E. tetralix*. Two other species, *E. ciliaris* and *E. vagans*, are found in a few western localities. Many important insect species of heathland are more dependant upon the same soil characteristics which make an area suitable for the growth of heathers than upon the heathers themselves; either as a direct or indirect food resource. This article is concerned only with species which are closely associated with heathers.

Ericaceous plants have a particular way of releasing their pollen on to insect visitors. The anthers are formed as a tube, with the pollen grains released to the inside of the tube, and the lower end having pores through which the pollen grains can be shaken out. In order for a visiting insect to obtain large supplies of pollen it must be able to shake the anthers, rather like applying pepper to one's dinner. It may come as a surprise to some that honey bees (*Apis mellifera*), large numbers of which can sometimes be seen flying over heathers, are merely acting as nectar robbers, taking very little effective part in the transfer of pollen from flower to flower. This is because honey bees are not able to vibrate the anthers, a process which has become known as buzz-pollination (Neff & Simpson 1993). The effective transfer of pollen between flowers depends upon the presence of other bee species, some of which are very closely associated with the heathers they pollinate, only flying during the flowering period between the end of July and September and obtaining the majority, if not all, of their pollen supplies from heathers. Species with such close relationships with specific plant species or genera are said to be **oligolectic**. It is possible that oligolecty is maintained by the newly emerged bee smelling the traces of the stored pollen upon which it fed as a larva.

Two bees which are oligolectic on heathers and widespread in the British Isles are *Colletes succinctus* and *Andrena fuscipes*. Both species nest in the ground and are solitary, with a single female digging and provisioning its own nest. The nest comprises ten to twenty or so cells; exactly how many depending on the lifespan of the individual bee and the foraging conditions prevalent. The females are about three-quarters the size of the honey bee with conspicuous bands of short hairs at the edges of the plates of the dark brown abdomen and orangey-yellow hairs on the thorax. The pollen is carried in special hairs on the hind legs and can be easily seen. Males of both species are less distinctive, being smaller, slimmer and less obviously banded on the abdomen. They may be found flying rapidly just over the tops of the heather at the end of July and beginning of August.

*Bombus jonellus*, sometimes called the heath bumblebee, is also associated with heathers, though less closely. It has two nesting cycles a year in the south of England, the first brood workers are produced by overwintered queens which initiate nests during March. These nests produce queens during June which mate and establish nests straight away. The queens produced by these nests during September then hibernate to initiate nests the following March. Second brood workers show a strong preference for foraging on heathers, as do too the single brooded individuals from further north; but the first brood workers, being among the earliest bumblebees present on southern heathlands, can have no chance of utilising heather flowers.

These bees have others which depend upon them and, ultimately, upon the heather flowers. Just as in birds, there are cuckoo species which steal the bees' nest provisions of nectar and pollen in order to raise their own young. *Bombus jonellus* is probably parasitised by the cuckoo bumblebee (*Psithyrus sylvestris*). The *Psithyrus* gains entry to the nest, eventually killing the *Bombus* queen and laying its eggs, which only produce males and females, in the cells which are tended by the *Bombus* workers. No more *Bombus* workers are produced and the colony eventually dies out as the *Psithyrus* males and females fly away.

The two solitary species of bee have their own cuckoo species which lay their eggs in the completely provisioned cells of their host. The parasite larva eats the egg or young larva of the host and then

consumes the pollen and nectar in the cell. As the cuckoo species steals the provisions laid down by the host species they are known as thief-parasites or cleptoparasites. Both the cuckoo species are conspicuously coloured insects; possibly an adaption to spending a long time flying over areas of bare ground looking for host nests where they are very open to predation by birds and it is worth advertising their distatefulness. *Nomada rufipes* is cleptoparasitic on *Andrena fuscipes*, it about one third the size of a honey bee and is brightly banded with yellow, black and red-brown on the abdomen. *Epeolus cruciger* is slightly larger, with black and silvery-yellow banding and is cleptoparasitic on *Colletes succinctus*. Very little is known about the effects of the parasites upon the breeding success of the host species; some cleptoparasitic species can appear to be almost as numerous as the host! A similar indirect dependence upon heathers is shown by one of our largest wasps, the sphecid *Ammophila pubescens*. This wasp has a conspicuous, long, thin, red abdomen which ends in a black tear-drop like swelling, the overall length being about 18mm.

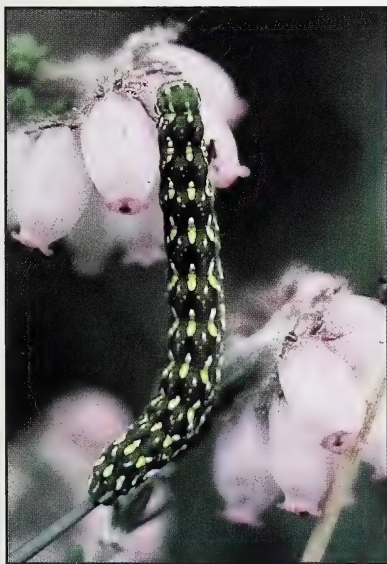


Fig. 1. The caterpillar of the beautiful underwing moth (*Anarta myrtilli*). [Photo: Ian Menzies]



Fig. 2. *Erica tetralix* 'Alba Mollis' showing signs of insect damage. [Photo: Brian Tysterman]



This wasp can often be seen flying along sandy paths on good quality heathlands in south-eastern England, sometimes it can be found dragging a parasitised caterpillar towards its nest; a burrow in the ground which it closes with sand grains, using a particularly large one to tamp the soil down. This tamping stone is held in the jaws and vibrated with the aid of rapid wing movements. Very often the caterpillar being dragged to the hole is that of the beautiful yellow underwing moth (*Anarta myrtili*), a common, but localised, heather feeder.

That wasp has its own probable parasite; this time a fly, the striking black and white bee-fly, *Thyridanthrax fenestratus*. This species is about three-quarters the size of a honey bee and has wings which are strikingly patterned with black. The exact relationship of *Thyridanthrax* to the *Ammophila* has been the subject of recent research by English Nature (Edwards 1994) but some details of the life history have still to be elucidated. The female fly digs her rear into loose sand by standing over the sand and attempting to fly backwards into it. The ovipositor has a series of miniature hooks around it which can move in and out as a miniature grab. It is thought that she is using these grains to coat the very small egg and increase its mass. After one or two digging actions she takes off and flies close to small tufts of heather and grass and can be seen to flick her abdomen towards the base of these. This flicking is known to be associated with oviposition in other bee-flies. What happens after that is not yet clear. However, *Thyridanthrax* has been reared from pupae of *Ammophila* which were dug up in the spring.

The caterpillar of the silver studded blue butterfly, *Plebejus argus*, is associated with another member of the aculeate hymenoptera, this time an ant (Joy 1995). The butterfly is known to have a range of food plants. On heathers the eggs of the butterfly are most frequently laid low down amongst small, but vigorous, plants during August but do not hatch until the following April. This requirement for small vigorous plants means that the butterfly is often found associated with areas where the vegetation is recolonising after having been burnt in the previous few years, especially when there is a high proportion of *Erica cinerea*. The larvae are attractive to two species of ants, *Lasius alienus* and *L. niger*, as they secrete sugars and amino acids from specialised glands. In return the larva gains

the ants' protection from potential predators and may even be taken into the ants' nest.

All the species mentioned above, with the possible exception of *Bombux jonellus*, have a need for areas of bare ground with recolonising heathers. This is particularly important for the establishment of nests which are made in open ground in warm situations. These conditions were maintained by the traditional management of heathlands but only recently have many modern heathland management programmes started to pay sufficient attention to this requirement; concentrating instead upon creating large expanses of flowering heather and treating areas of open ground as eyesores in need of re-vegetating as quickly as possible (Edwards 1994; Joy 1995).

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[D. Small: Heather Society Slide Library]

### ***Erica arborea* 'Estrella Gold'**

Broad evergreen shrub to 2m having gold foliage in winter turning lime green in summer, white flowers in Spring.

ref. *Yb Heather Soc.* 1977: 50; 1979: 58; van de Laar, *The heather garden* (1978); de La Rochefoucauld, *La bruyère* (1979)

*Erica arborea* 'Estrella Gold' was found as a seedling by Rinus Zwijnenburg of Boskoop, Netherlands, in 1972 whilst travelling in the Sierra da Estrela, east of Coimbra in Portugal. It was introduced by Peter Zwijnenburg of Boskoop by 1974 and received an A.G.M. in 1992.

Although other yellow-foliaged *Erica arborea* seedlings were found in Spain by D. C. McClintock, E. C. Nelson and D. J. Small (McClintock, *Yb Heather Soc.* 1983: 39), none has been selected for naming.

**D. J. Small**



## **Improved seed germination of Cape *Erica* species by plant-derived smoke.**

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The Cape Floral Region, in which fynbos is the dominant vegetation, has approximately 1400 species which are rare, threatened or endangered. This constitutes 72% of the total for threatened or endangered species in the whole of South Africa. The Ericaceae is one of three major families defining fynbos. Many of these species have outstanding horticultural value and at least 100 species are also rare, threatened or endangered.

Propagation of many Cape *Erica* species from seed is difficult, as seeds are dormant and require very specific environmental cues for germination. A characteristic feature of the fynbos environment is the recurrence of fires, and seeds of many species are adapted to germinate in response to one or more cues provided by fire.

Recently it has been discovered that in addition to the more obvious effect of heat, smoke from fynbos fires on it's own is responsible for stimulating the germination of seed of many *Erica* species. This is an important discovery which has considerable significance for the conservation and restoration of fynbos vegetation and is of major economic importance in the utilisation of *Erica* species with horticultural potential. About 40 species were screened with smoke treatment and the results suggest that about 26 species had improved germination ranging from 164% to 8100%.

Many more of the Cape heaths will have to be investigated in the nursery and in field experiments before any pattern of response within the family can be elucidated. Amongst the species responding to smoke treatment were a number of species of particular horticultural importance. These include *E. curvirostris*, *E. formosa*, *E. glomiflora*, *E. pinea* and *E. phylicifolia*. The smoke treatment ensures a much greater efficiency when propagating from seed and this should make more plants available to the horticulture industry.

### **Procedure used to smoke seeds**

1. Seed is sown in conventional plastic trays and is covered by a thin layer of soil
2. The trays are placed in a polythene tent and smoke is pumped into the tent by means of a plastic pipe from a large metal drum.
3. The smoke is generated in the drum by burning a mixture of dry and green Fynbos leaf and stem material. The trays are left in the smoke for 1 to 2 hours.
4. At the end of this period the trays are removed and the seeds carefully watered to wash the smoke deposit in the soil.
5. The seed trays are then placed under cover in a shade house until the seeds have germinated.
6. As many fynbos seeds require fluctuating day/night temperatures for germination, the best time to sow and treat *Erica* seed is in the late summer and early autumn.

### **The new 'Instant Smoke Plus' seed primer**

The new primer solution contains a combination of natural substances which have been found to overcome dormancy and stimulate *Erica* seed germination. The degree of response varies with the species but, on average, treated seed samples give at least double the number of seedlings when compared to untreated samples. "Kirstenbosch" is the registered trademark of the new primer. Orders can be placed at the Kirstenbosch address.

### **Procedure for use**

1. As required, place one primed paper disc in a container (e. g. cup). Add 50 ml water to the container and wash the primer from the paper.
2. Seed is also sown in conventional plastic trays and covered by a thin layer of soil.
3. Add 950 ml of water to the primer
4. Water seed trays carefully with primer solution, use a watering can with a fine spray of a hand spray
5. Keep wet with solution for at least 24 hours. Water thereafter as normal

### **Reference**

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## **The frost resistance of heaths and heathers.**

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This paper is an attempt to summarise what is known of the frost resistance of heaths and heathers, members of the Ericoideae (i.e. *Calluna vulgaris* and *Erica* species).

First of all, how can the frost resistance of heathers be determined? One way is to record winter frost damage either in collections of heathers or amongst wild species in the field. This allows species and cultivars to be ranked with regard to the degree of damage they experience, whilst meteorological records enable the temperatures causing damage to be quantified. The main problem with such a method is that one has to await a severe winter which, when it occurs, will cause substantial damage to one's valued specimens.

*Erica erigena* provides a convenient example of this approach. It is relatively hardy and is killed only by the severest frosts in Britain and Ireland. In plots at Stirling, Scotland, plants of *E. erigena* originating from Loch Nalawney (Connemara, County Galway) escaped winter damage when other heath plants of southern origin showed some damage (Bannister 1981). However, these same plants were completely killed after the severe 1979 winter when the minimum air temperature was  $-15^{\circ}\text{C}$  (R. H. Marrs, pers. comm.). At Harlow Car, England, above-ground shoots of cultivars of *E. erigena* were killed after air frosts of  $-13^{\circ}\text{C}$  in 1979, but regeneration occurred from stem bases (Vickers 1983) and death occurred in 1982 after a minimum air temperature of  $-16.9^{\circ}\text{C}$  in December (Julian 1983). In Ireland, plants of *E. erigena* in the National Botanic Garden, Dublin, were damaged after air temperatures of  $-11.5^{\circ}\text{C}$  in 1982, but regenerated from stem bases (E. C. Nelson pers. comm.), and Foss (1986) recorded damage in the field in Mayo after an air frost of only  $-8.1^{\circ}\text{C}$ . These observations suggest that *E. erigena* is likely to be killed completely when air temperatures fall below  $-15^{\circ}\text{C}$  and to



suffer damage, but be capable of recovery, at temperatures between  $-8^{\circ}\text{C}$  and  $-13^{\circ}\text{C}$ .

A second method involves artificially subjecting plants to low temperatures and monitoring their survival. This obviates the need to wait for cold weather and has a second advantage in that it is possible to measure the frost resistance of cut shoots rather than whole plants. Generally either the temperature causing 50% damage to shoots (or killing 50% of plants) or the lowest temperature at which plants escape damage is used as a measure of frost resistance. In 1994–1995, Tony Polwart of Keele University and I monitored the annual course of frost resistance of cut shoots of *E. erigena* (originating from Loch Nalawney and grown at Ness Gardens in Cheshire) and found a maximum winter frost resistance of  $-15^{\circ}\text{C}$ . Sakai and Miwa (1979) treated shoots to 15 days of low temperatures ( $-1^{\circ}$  to  $-3^{\circ}\text{C}$ ) to induce maximum hardiness, and reported that *E. erigena* (as *E. mediterranea*) was damaged by temperatures of less than  $-18^{\circ}\text{C}$ . These values are in fair agreement with the estimates made from the field observations that were mentioned previously.

Frost resistance is not constant and varies through the year. The main factors influencing frost resistance are day length and temperature. Young shoots are frost sensitive, but harden as the tissue matures and as the days shorten. In short days, frost resistance is further increased by exposure to low, not necessarily freezing, temperatures (i.e. below  $5^{\circ}\text{C}$ ) as autumn progresses into winter. However warmer temperatures during the day cause de-hardening so that increased temperatures during late winter and spring cause a loss of frost resistance. Thus the maximum winter frost resistance of a particular plant may vary from year to year, depending on the prevailing weather. For example, our studies at Ness Gardens found that the frost resistance of *E. erigena*, *E. ciliaris* and *E. mackaiana* was several degrees less in the mild 1994–1995 winter than the preceding, colder winter. The greatest danger of frost damage, however, may not be in winter but rather in autumn, late winter, or spring when less hardened plants may be damaged by early and late frosts of a lesser severity than those in midwinter.

Genetic factors also influence frost resistance, so that members of the same species of different provenance are likely to differ in

their frost resistances as much as they do in their patterns of growth and flowering (see Bannister 1978, 1981). Consequently different cultivars are unlikely to have identical frost resistances. This is well illustrated by the work of Sakai and Miwa (1979) who showed a range of winter frost resistances in cultivars of *Calluna vulgaris* from  $-17^{\circ}\text{C}$  ('Joy Vanstone') to  $-35^{\circ}\text{C}$  ('Nana Compacta', 'H. E. Beale').

Another question that might reasonably be asked is whether the frost resistances of various species of heather relate to their biogeography. In a broad sense they do. Cape heaths are known to be tender and show a range of measured frost resistances from  $-5^{\circ}\text{C}$  to  $-8^{\circ}\text{C}$  with the hardier species such as *E. caffra* and *E. canaliculata* showing the highest resistances (Sakai & Miwa 1979). In contrast, the same authors found that frost resistance of European *Erica* species ranged from  $-13^{\circ}\text{C}$  (*E. lusitanica*) to  $-23^{\circ}\text{C}$  (*E. carnea* 'Snow Queen'). Within Europe, *Calluna vulgaris* has the most northerly and continental distribution of all the heathers and the greatest frost resistance ( $-29^{\circ}\text{C}$ , Ulmer 1937;  $-17^{\circ}\text{C}$  to  $-35^{\circ}\text{C}$ , Sakai & Miwa 1979). *Erica tetralix* also has a northerly distribution (extending into southern and western Scandinavia and eastwards into Poland) and a maximum frost resistance of around  $-20^{\circ}\text{C}$  (Till 1956; own unpublished data). *Erica cinerea* and *E. vagans* have highly oceanic distributions, and our unpublished data (from lowland sites) recorded maximum frost resistances of only  $-12^{\circ}\text{C}$ . Species such as *E. ciliaris*, *E. mackaiana*, and *E. erigena* have more southern, oceanic distributions and might be expected to have even lower frost resistances, but this does not appear to be the case, as we found that Irish examples of these three species have maximum frost resistances in the range  $-15^{\circ}\text{C}$  to  $-18^{\circ}\text{C}$  (unpublished data). Consequently, it is unlikely that the distribution of these species is limited by an ability to develop adequate levels of frost resistance.

Outside the Ericoideae, arctic and alpine ericaceous species (e.g. species of *Vaccinium*, *Cassiope* and *Rhododendron*, *Loiseleuria procumbens*, and even *Calluna vulgaris*) can be hardened to survive temperatures below  $-30^{\circ}\text{C}$  and some can survive temperatures as low as  $-70^{\circ}\text{C}$  (Sakai & Larcher 1987). Against that background, *Erica* species do seem to be the most tender and sensitive members of the family.

### Acknowledgements

The measurements of frost resistance at Ness Gardens were carried out when I was on sabbatical leave from the University of Otago. I am most grateful to the following: Rob Marrs who provided space and facilities at Ness Gardens; Hugh MacAllister who allowed me to decimate his collection of Irish heathers; and Tony Polwart (Keele University) for his collaboration and provision of facilities for the determination of frost resistance.

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*Yb. Heather Soc.* 1996: 43-46.

## **Reproduction in *Erica mackaiana*.**

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### **Introduction**

There has been much argument in the past about the status of *Erica mackaiana*, whether it is a true species or merely a variety of *E. tetralix*. Much of this discussion has arisen because the plant appears to be incapable of producing seeds in its three known Irish localities. It has been little studied in northern Spain where it is a common component of the vegetation on wet heathy hill-sides. Excursions to this part of Spain in 1967 and 1976, and to the Roundstone area of Galway in Ireland in 1968 allowed me to make observations of the plant in the wild and to obtain material for cultivation.

### **Seed production**

The production of seed has never been reported in the literature, though Webb (1955) deduced its existence in northern Spain from the occurrence of what he interpreted to be seedlings. As we shall see later, there may be some doubt that what he saw were in fact seedlings. No plants with cotyledons were reported.

I have examined much material in the wild at Craiggamore near Roundstone, and Lough Nacung material in cultivation, and have been unable to find any seed. However, even though the Spanish sites were visited in late June and July 1967 when *E. mackaiana* was in full bloom, seed was frequently found in the previous year's capsules, concealed within dense bushy plants, usually growing in moist, sheltered places. The ornamentation of the seed coat is areolate and very similar to that of *E. tetralix* and *E. cinerea*, but quite distinct from that of *E. ciliaris* in which the ridges do not meet in such a way as to form a distinct areolation. Numerous seedlings were seen, but only on bare, damp, clayey soil, often growing with bryophytes, at the sides of ditches and streams. All stages were seen from seedlings with cotyledons only, to plants a year or two old

with withered cotyledons. They grew with seedlings of the associated species, *E. ciliaris*, *E. cinerea* and *Daboecia cantabrica*. The *E. mackaiana* seedlings could certainly be distinguished, even from those of *E. ciliaris*, by the time they had developed the third whorl of post-cotyledonary leaves, as by this stage the characteristic pilosity has developed on the upper surface of the *E. ciliaris* leaves. These fine, velvet-like, pilose hairs are most easily seen by holding a leaf up to the light and carefully examining the upper surface of the leaf with a hand lens. These hairs are never present in *E. mackaiana* and are always in *E. ciliaris* and *E. tetralix* and their hybrids *E. x watsonii* (*E. ciliaris* x *tetralix*) and *E. x stuartii* (*E. tetralix* x *mackaiana*) and so are the most definitive character for distinguishing *E. mackaiana* from its closest relatives. The seedlings of *E. cinerea* are easily distinguished by the much narrower post-cotyledonary leaves and those of *Daboecia* by their much larger size. There is therefore no doubt that *E. mackaiana* in Spain regularly reproduces by seed.

In cultivation I have obtained viable seed from an Irish plant from Lough Nacung in Donegal by growing it in a pot alongside a Spanish plant. This evidence suggests that the sterility of the Irish material is due to the reduction of the colonies in the wild to self-sterile clones.

### **Vegetative reproduction**

Webb (1954: 190; 1955: 362) referred to the fact that *E. mackaiana* is favoured by small-scale disturbance to the peat in which it grows. He concluded that this is due to regeneration from fragments of its twigs and commented on how masses of such regenerating shoots on the edges of peat cuttings resemble a crop of seedlings. However it seemed strange that only *E. mackaiana* should regenerate in this way when *E. tetralix* and *Calluna* were at least as frequent in some sites.

In Spain in 1967 I had noticed *E. mackaiana* plants growing on very dry, sandy, largely bare soil on top of a quarry which appeared to be surrounded by numerous seedlings. This was an extremely unlikely habitat for seedling establishment, and examination showed that none of the small plants bore cotyledons. Excavation revealed that the young plants were in fact proliferations from horizontally growing roots (Fig. 1). On a dry roadside bank in the same area the crumbly shaley rock had numerous pockets of soil which appeared

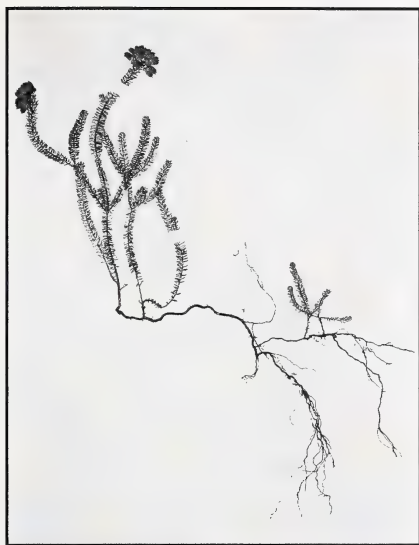


Fig. 1 *Erica mackaiana* proliferating from roots; northwestern Spain July 1967.

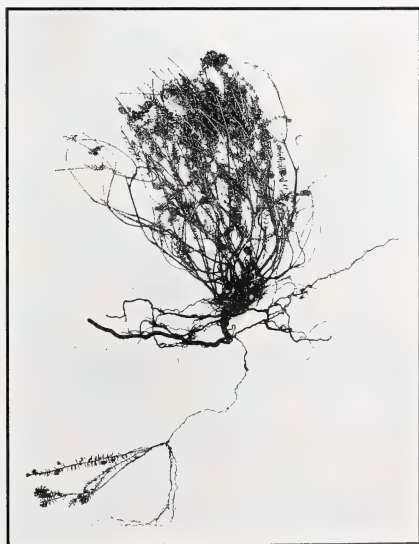


Fig. 2 *Erica x stuartii* proliferating from roots; Ireland.



to be supporting isolated *E. mackaiana* seedlings which were some distance (often 30–60 cm) from the nearest large plant. Again, excavation proved these to have sprung from roots which had grown through the crumbling rock.

In Ireland excavation was more difficult as it was not so easy to extract the roots from fibrous peat as it had been to remove them from the gravelly soil in Spain. However, it was clear that here too, *E. mackaiana* showed extensive regeneration from roots and that this was why disturbance of the surface vegetation so favoured the species – no other species is capable of such regeneration from fine roots. In certain places peat cutting was being carried out and sometimes the surface vegetation had been removed in preparation for cutting but no deeper digging had taken place. In these situations the vegetation developing was an almost pure stand of *E. mackaiana* proliferating from broken roots in the peat. Similarly *E. mackaiana* was frequently the only species growing from bare peat blocks which had been cut and left lying and from blocks cut out from the surface and left inverted over neighbouring vegetation.

In Ireland *E. x stuartii* was also examined and found to be capable of proliferation from its roots but less freely than *E. mackaiana* (Fig. 2).

These observations suggest that *E. mackaiana* and *E. x stuartii* could be propagated by root cuttings but they root so easily from soft young shoots that there is probably no need for another method.

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*Yb. Heather Soc.* 1996: 47-48.

## **Casual observations (1982, 1994) on *Erica tetralix* in Picos de Europa, Asturias, Spain.**

**E. CHARLES NELSON**

National Botanic Gardens, Glasnevin, DUBLIN 9, Ireland.\*

*Erica tetralix*, cross-leaved heath, is a calcifuge shrub that is characteristic of oligotrophic, acidic soils, and of wet, humus-rich habitats such as raised bogs and blanket peat. Thus its presence within an area which is underlain by Carboniferous Limestone is unexpected unless there is a geological or topographical anomaly that permits the development of suitable, non-calcareous habitats.

During June 1994, while based at Carreña de Cabrales (Asturias), I noted *Erica tetralix* in three localities which cannot be characterised as bogs. These populations were at Collado de la Caballar, north-east of Sotres (c. 1200 m alt.), and north-facing slopes between Majada de Tordín and Tielve mirador, and between Collado de Pandébano and Majada de la Terenosa (c. 1300 m alt.). The localities, about 5 km south-east of Arenas de Cabrales, are respectively about 25 km north of Peña Prieta, and 18 km east-north-east of Vegabaño, the nearest habitats of *E. tetralix* noted by Rivas Martínez *et al.* (1984).

At Collado de la Caballar, *Erica tetralix* was associated with bell heather (*E. cinerea*), Cornish heath (*E. vagans*) and ling (*Calluna vulgaris*) in an open heathland. The same species were present in the same type of vegetation between Majada de Tordín and Tielve, and between Collado de Pandébano and Majada de la Terenosa. The most notable absentee from all the sites where *E. tetralix* occurred was Mackay's heath (*E. mackaiana*) which elsewhere in northern Spain is very rarely found growing with *E. tetralix* (Nelson & Fraga Vila, 1984), a marked contrast to the Irish populations wherein a hybrid between these two species, *E. x stuartii*, is abundant.

I did not have sufficient opportunity to examine the populations in detail, so neither their extent nor the edaphic propensities of the

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soil could be determined. However my casual observations are that *Erica tetralix* was growing in well-drained, humus-rich soil in habitats which were undoubtedly abundantly supplied with moisture from mist and rain. There was no evidence of water-logging, and the associated species did not include plants typical of waterlogged bogs (e.g. bog asphodel (*Narthecium ossifragum*), common cottongrass (*Eriophorum angustifolium*), deergrass (*Scirpus cespitosus*)). The habitats were not oligotrophic bogs. Rivas Martínez *et al.* (1983) reported the presence in Cordillera Cantábrica (Picos de Europa) of one vegetation association including *Erica tetralix*, and noted that this association was found on oligotrophic bogs (turberas oligótrofas). *Erica tetralicis*-*Trichophoretum germanici* association contains other calcifuge, wetland species including *Narthecium ossifragum*, *Eriophorum angustifolium* and *Scirpus cespitosus* subsp. *germanicus*. Rivas Martínez *et al.* (1983) listed six localities where examples of this association were found: at Vegabaño (León), Pico Jario, Vega Cimera (Asturias), Alto de la Baba (Asturias), Peña Prieta (Palencia) and Curavacas (Palencia).

In July 1982, *Erica tetralix* was observed by D. McClintock, E. C. Nelson and D. Small (McClintock 1983) at several other localities within Cordillera Cantábrica: Puerto del Escudo on the main road to Burgos (c. 1100 m alt) (Cantabria); Puerto de Leitariegos, south of Cangas de Narcea (León); near Huergas de Barbia, west of San Emiliano (León); Puerto de Ventana, between San Emiliano and Trubia (Asturias); 4 km from Covadonga monastery on road to Lago Enol (Asturias).

Voucher specimens for these records are in DBN. My thanks are due to Adrian Garlick (Spantrek) for facilitating my observations in 1994, and to David Small for those in 1982.

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## **Constance MacLeod** **The Society's first Secretary.**



Constance MacLeod died on 28 February 1995. Born on 17 June 1904 in South Africa, near Durban, Natal, she won a scholarship at the High School to the University of Natal where she read Latin, French and Botany. Having gained a first class degree at the age of 19, she began a teaching career. In 1930 Constance spent a year on a teacher's exchange scheme in London. There she met a distant cousin, Donald MacLeod, an army officer who later rose to the rank of lieutenant colonel. She returned to South Africa, but in 1934 came back to England and they were married.

The MacLeods settled in Horley, Surrey, three miles from where my parents, Roy and Mabel Turner, had built a house some seven years earlier. They were of the same age as

Constance and although both families were obliged to spend the war years elsewhere, they returned to become involved in the same local activities in this once-quiet rural community. (None of them foresaw, then, the arrival on their doorstep of Crawley New Town, the M23 and Gatwick Airport!) The MacLeods, as members of the Horley Local History Association, were always delighted to show people round their historic sixteenth century cottage, Yew Trees, whose garden was gradually converted from roses to heathers.

Constance gained committee and administrative experience with the parish and rural district councils, as well as with the Cottage Hospital and Empire Hall management committees. It was not

surprising, therefore, that her husband nominated her as Secretary of a society which an old school chum of his, Sir John Charrington, set out to create in 1963 to promote the popularity of heathers as garden plants.

Sadly Donald died only a year later. Constance then gallantly also assumed the office that he had held as Treasurer. Her daughter, Mary Hall, recently said: 'My mother did not make friends easily after coming to England, but this involvement with The Heather Society and the appreciation of members made her life worth living, in a way that nothing else could have done.'

She worked closely with Sir John Charrington, who had been appointed first Chairman. Following the inaugural meeting at the Royal Horticultural Society, Vincent Square, London, Sir John arranged for the Heather Society to hold its subsequent annual general meetings at the London office of the Coal Utilisation Council of which he was an official. Constance did all the mailings of the *Yearbook* unaided, using a small manual typewriter. Later the *Bulletin* arose out of her desire to communicate with all members, not just those who wrote to her personally. She enjoyed corresponding with people all over the world on her favourite subject and in letters gave and received real affection. She became very knowledgeable on all aspects of heather growing and kept up-to-date with the new heather cultivars.

Our first Secretary was particularly anxious that non-hardy Cape heaths should not be entirely neglected. She maintained a correspondence with Ted Oliver and visited him when she went on holiday to South Africa.

After Constance had recovered from a hip replacement in 1970, she was warmly welcomed back at the AGM by Sir John and was overwhelmed to receive a considerable ovation from an appreciative assembly. The Society's membership had much increased as a result of her personal interest and she persuaded my father, a retired banker, to take over the treasurership in 1972. She was an early riser, starting her correspondence at 5.30 in the morning. By 7.30 she would be on the phone to him for half an hour discussing membership problems, as well as how to reply to the latest of the weekly letters from Sheffield, with which John Ardron bombarded her. She and Mr Ardron were both very strong-minded personalities and had very different ideas on how the Society should be run!

She particularly enjoyed her first ten years in the Heather Society, but felt she lost one of her links with the past when Sir John died in 1977, three years after moving from his lovely heather garden in Kent. A handbag, which appears in many photos, was given to her by him and she cherished it until she died in her 91st year.

On her retirement from the secretaryship in 1977, Constance took up bookbinding and set about the renovation of her book collection. She remained reasonably active until about 1988 and could still potter in the garden two years later. When visiting her in the autumn of 1991, I found her very content despite a lack of mobility. She was delighted to browse through the Society's photograph albums which I took along for her to see. Her dark brown eyes shone as she happily reminisced over the early days.

Constance had been increasingly unwilling to go out for fear of falling. Also her house had been burgled three times while she was at home. She was eventually persuaded in 1992 to leave the cottage for the Old Rectory Nursing Home at Newdigate. She enjoyed her 90th birthday celebration there in June 1994, but eventually was no longer able to read, walk or concentrate.

Her funeral was held in Horley, and the Society was represented by David and Anne Small, as well as by me and my husband. After the ceremony her daughter, Mary, with her children, Katy and Christopher, took the lovely heather floral tribute which the Chairman had brought and laid it in the garden at Yew Trees.

Constance dominated Council meetings during Arthur Bowerman's chairmanship; she had rigid ideas and was sharply critical of and argumentative with whomsoever she disagreed. Although she could be difficult to get on with, she was much admired and charmed people with her infectious enthusiasm and cheery smile. We today owe much to her dedicated work for the Society in its early years.

***Pamela B. Lee***

*Secretary*





[K. Kramer]

### ***Calluna vulgaris* 'Alexandra'**

Evergreen subshrub, belonging to a form of *Calluna vulgaris* in which the flowers never develop beyond the bud stage. The buds start, in late summer, white at the base with a pale crimson tip which develop with age to deep crimson (Deep H13) by early winter.

ref. *Yb Heather Soc.* 1994: 39; 1995: 52.

This cultivar has been one of the startling successes of Kurt Kramer's breeding programme which he started in 1981. This particular seedling was raised about 1991 and first introduced in 1993. It was bred to compete with the Cape heath *Erica gracilis* which is sold by the millions each year in October for decoration of graves on All Saint's Day in Europe and for winter window box and tub displays. *C. vulgaris* 'Alexandra' is protected by Plant Breeder's Rights throughout Europe and will receive similar protection in North America.

***D. J. Small***

## 25th Annual Conference National Botanic Gardens, Glasnevin 4-10 September 1995

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### Foreword

**David McClintock**, President

The highlight of the year has been the outstanding success of the Irish visit. With typical 'Irishness' it was dry in the normally wet west and wet in the driest part of Ireland on the way to David Robinson's garden at Howth! Our many visitors from overseas must have felt their journey well worthwhile, just as we were delighted to have them with us. But we missed our faithful Swedish member Brita Johansson, who had been seriously unwell but I am glad to report better now. And I have never heard a better set of lectures than those given to us at Glasnevin.

But it was not just the weather, and the lectures, and the glorious scenery and flowers that made this so successful. With the support of his Director, Donal Synnott, Charles Nelson organised the conference programme and its associated field trip, at the same time that he was arranging his own wedding. And the intricate business of arranging for members from California, Canada, New England, Italy, Holland, Norway and South Africa to get to and from the far west of Ireland (those from Germany made their own arrangements) was quietly and efficiently undertaken by Anne Small and her husband, our Chairman. As a result everything ran with smoothness. It was such a friendly party too. My warm thanks to all who made it so. My expectation that the occasion of the bicentenary of the National Botanic Gardens, Glasnevin, and the Heather Society's 25th Annual Conference and A.G.M. would be very special, was fulfilled.

Outside Britain, where shall we go next? Our Dutch counterpart Ericultura celebrates its silver jubilee in 1996, an occasion we would want to join. Their plans include a visit to England in mid-May.

### Connemara and The Burren

**Maurice S. Everett**

When Dr Charles Nelson planned this field trip to precede the Annual Conference in Dublin, he confidently expected to attract a dozen or so of our hardier members. However, this was to be a rare opportunity to be *taken* to see heathers not found growing wild elsewhere in, as Charles put it, the Celtic Archipelago (also known as the British Isles), and the word got around! As a result, enthusiasts from Canada and USA (members of the North America Heather Society), Holland, Italy, Norway,

Britain and Ireland flocked to Connemara. When the party assembled in Clifden, we numbered around 60 – enough to fill two of the best hotels - but we all mingled sociably over dinner each evening. By a coincidence, about 20 members of the German Heather Society were also in the area. We had the pleasure of meeting them at the Connemara National Park and some of them joined us on one of our field trips.

We had been warned that we would be visiting one of the wettest areas in Ireland (an average of 265 days of rain each year and rainfall measured by the yard) but we could have left our wet-weather gear at home. After such a dry summer, even the famous bogs were more like meadows. The three days of the field trip were dry, sunny and warm, with only a brisk breeze on occasions to frustrate the photographers.

On the first day we were taken to the Connemara National Park, Letterfrack. In the Visitor Centre, the Park Superintendent, Dr Noel Kirby, explained how he and his staff are conserving the natural flora, fauna and landscape of Connemara within the 2000 acres (800 ha) Park. After coffee, Charles Nelson spoke about Irish heathers, whetting our appetites for what we would see later. A fairly energetic guided tour of the Park in the afternoon took us past a megalithic tomb and gave some of us our first sighting of *Daboecia cantabrica* in the wild, as well as the more familiar *Calluna*, *Erica cinerea* and *E. tetralix*. Brilliant gold among the heathers (and protecting them from grazing animals with its spines) was the dwarf gorse, *Ulex gallii*, in full bloom. We saw part of the 14km-long deer fence but the red deer (recently reintroduced to the area) kept out of sight. Not so the very friendly Connemara ponies, well-adapted to the rugged terrain.

Even though we spent almost seven hours at the National Park, it was impossible to take full advantage of all the excellent facilities: most of us saw the breathtakingly beautiful audio-visual display about Connemara and the fascinating exhibition illustrating the history of the peat bogs but only a few found time to take in the Sruffaunboy ('Yellow stream') Nature Trail. One member of our party looked longingly at the steep, rocky outline of nearby Diamond Hill and vowed he would climb to its peak if he had the time – knowing full well we had to leave in a few minutes! On our return journey, we made a detour along the scenic Sky Road for wonderful views to the offshore islands and across Clifden Bay. We deliberately misdirected the coach driver so that we could admire and applaud his remarkable ability to turn the coach in less space than most of us would need for a car.

The large size of our party made it essential for it to be split into two groups for the visits to several different habitats in Connemara



and The Burren. This was delicately and diplomatically arranged (accompanied by much merriment) by our Chairman, David Small, and Charles Nelson, between the four courses of an excellent dinner.

The next morning, *our* coach headed south and at Ballinaboy took the aptly-named Bog Road towards Toombeola. Our leader, David Small, recognising a rocky landmark, got our driver to stop so that he, David, could investigate. After a few strides into the relatively dry bog he gave a beckoning wave signifying instant success. We were about to see the only plants (perhaps a dozen) of *Erica ciliaris* growing wild in Ireland. They were, however, very effectively guarded – not just by the ranger, who arrived hard on our heels, but also by a swarm of midges. We admired the plants, pondered briefly how they came to be there, took our photographs and beat a hasty retreat.

Further along the same road, we found a real quaking bog and bounced from tussock to tussock looking particularly for *Erica mackaiana*, *E. tetralix* and their hybrid *E. x stuartii*. David Small claimed that once we ‘got our eye in’ we would be able to spot *E. mackaiana* at 50 paces. Maybe some of us could but many resorted to pulling apart a flower very gently and examining the ovary with a hand-lens. *E. mackaiana* and *E. tetralix* are easy to distinguish: the former having a totally hairless ovary whereas that of the latter is downy. Their hybrid is intermediate in character and repeatedly the cry went up: “How many hairs make a *stuartii*?” The authoritative answer appeared to be “Just one!”, so a really thorough examination of an apparently bald ovary was deemed to be absolutely essential before a plant could be placed in the Mackay or the Stuart clan.

Next we were taken to Carna, via Glinsk, to see the multipetalled form of Mackay’s heath, *E. mackaiana* f. *multiplicata*, in a very wet bog. We also hunted for various forms of *Daboecia*, including the “double-flowered” ‘Charles Nelson’, which was soon spotted by our eagle-eyed *Bulletin* editor. A white *Daboecia* was disqualified by David as it had a reddish calyx. However, a true white was seen by the other group the following day. Despite our best endeavours, no sighting was made of a *Daboecia* with upward-facing flowers (*D. cantabrica* f. *blumii*).

Lunch at Roundstone was the occasion for some excellent food and a brief flurry of excitement: someone claimed to have spotted an *Erica vagans*! So he had – but in a garden!

After lunch, we left the coach in Roundstone and headed west into the hills to find *Erica erigena*. Walking and scrambling up the green, rocky side of Errisbeg, we skirted the summit (which almost tops a thousand feet) and reached the shoulder between Errisbeg and

Roundstone Hill. The views were magnificent. We had been told to look out for a small lough in a hollow just downhill from our viewpoint. We did find a rather wet depression abounding in sundews, but the promised lough had disappeared in the drought. *E. erigena* was not difficult to find along the edges of the not-quite-dried-up water course. Not far away someone found a tiny trickle of water cascading just a few inches into a small rocky pool surrounded by prostrate junipers, *Calluna*, *E. cinerea* as well as *E. erigena*. Our cameras clicked yet again.

The most exciting find of the day was made just as we were about to return to the coach. How many of us would even have recognised it as a heather? With its *upturned* bright pink flower and its *ragged* petals, it looked more like our native ragged robin. Only its familiar cross-leaved stems really gave the game away. This was the split-corolla form of the cross-leaved heath, *E. tetralix* f. *fissa*.

Our third day was spent in The Burren, where most of the others had been the day before. Although only just across Galway Bay from Connemara, and enjoying the same climate, The Burren presents a very different prospect. It is a paradox, or, rather, a whole series of paradoxes. This seemingly dry, barren, rocky landscape provides homes for a unique array of Alpine, Arctic and Mediterranean plants. I am not the one (even if space permitted) to explain how and why acid-loving plants such as ling *thrive* here, and why trees like holly, hawthorn and yew, grow no more than a few inches high.<sup>1</sup>

We skirted the north-east edge of The Burren and turned southwest at Cappaghmore, through a pass in the steep hills. When the minibus stopped, we were all glad to disembark and stretch our legs after the long drive from Clifden. Half-a-mile or so away we could see a cliff face, topped by Eagle's Rock, from where our advance was observed by a herd of goats (known hereabouts as Burren deer). Had they been grazing the stunted trees only just peeping out from the fissures (or, in Irish, scailps) in the limestone pavement? Here we saw the rusty-back fern, tiny plants of the burnet rose, harebells, the conspicuous seed heads of the carline thistle, and so much more. On top of the limestone, in small, saucer-shaped depressions, were many lime-hating *Calluna* and *Erica cinerea*, evidently growing in an acid environment despite the presence of the limestone only a few millimetres below. Next, we found ourselves in a wild flower meadow containing perhaps a hundred

<sup>1</sup> For a full explanation of all the wonders of The Burren you must read E. C. Nelson & W. F. Walsh. 1991. *The Burren: a companion to the wild flowers of an Irish limestone wilderness*.

different species. We did not stop to count them but noted, amongst those in flower, knapweed, devil's-bit scabious and, most memorable of all, the delightful white grass-of-Parnassus – neither a grass nor from Parnassus! Sheltering at the foot of the cliff were the ruins of the tiny eighth century St MacDuach's Church and its adjacent well. A more isolated and forbidding site would be difficult to imagine – none of us felt the urge to become a hermit.

After a smoked salmon lunch at Ballyvaghan, we travelled to the north-west corner of The Burren, where the limestone of Black Head looked almost snow-white in the afternoon sun. We explored the narrow strip of limestone pavement between the coast road and the waters of Galway Bay (on the far side of which could be seen the hills and mountains of Connemara). Here were the ubiquitous heathers perched on the limestone and, in the scailps, several ferns, together with a number of flowering plants, including wood sage with its orchid-like flowers and the common but, nevertheless, attractive bloody cranesbill and herb Robert. Much appreciated, especially by those who had not visited The Burren in the spring, was the sight of mountain avens still in flower. We scrambled around, hither and thither, trying to take it all in and delaying our departure until the last possible moment. Eventually and reluctantly we had to leave!

Back at the hotel in Clifden, after another excellent dinner, a vote of thanks to Charles Nelson and David Small for an outstandingly successful trip was proposed by Allen Hall and greeted with thunderous, heartfelt applause.

## **Remembering Dublin**

**R. J. Cleevely**

Arriving from all parts during Friday afternoon, delegates gradually managed to wend their way round the Dublin City University campus to locate Registration in the University Accommodation office. After along journey the boundary road detour was almost the final straw – but the “H.S.” signs, or Ros Cleevely, indicated they had almost reached their goal. But even then – some had to find what seemed to be non-existent rooms in the accommodation's maze of doors; or even then negotiate room changes. Seventy-four delegates (or more!) attended, but not all reached their dining tables at *seven sharp*, which was just as well, for neither had the food!

Fed, re-united with friends and/or introduced to others, delegates assembled in a lecture room for the Chairman's opening and a poetic, light-hearted introduction from Dr. Charles Nelson, the organiser.



Next morning, everyone came to terms with a self-service breakfast and learnt that 'a ten to twenty-minute' walk in Dublin really means a trek of more than half-an-hour. At the National Botanic Gardens, delegates were welcomed by the Director Donal Synnott, who expressed his pleasure at the Heather Society's presence during the bicentenary commemorations. The morning's lecture programme was described by some as "the best ever!": attractive Irish gardens; fens, raised and blanket bogs; and the morning ended with Ted Oliver's enjoyable and colourful summary of Cape heaths. That only served to whet everyone's eagerness to see the display of South African *Erica* species that had been flown over from the National Botanical Institute in Kirstenbosch by Ted Oliver and Deon Kotze. For many, including those who admit to preferring our northern species and their cultivars, this has been declared the highlight of the 1995 conference. What was also a surprise to some was to discover that **the authority** on the Capes, of whom we had been aware for some 30-odd years, was **not** some wizened old professorial type, but the friendly, rather dapper gentleman who had just given us a splendid talk.

Another 'lottery-table' meal and then in the afternoon most delegates departed for a tour of the Wicklow Mountains National Park ending at Glendalough - but afterwards really wishing they had not gone at all! An enraptured few, captured by the unique display of Capes, had elected to view, photograph, or do otherwise to them, at their first opportunity and stayed behind. Fortunately, everyone else had ample occasions during the weekend to follow suit - this honey-pot was never free from admirers!

Somehow, everyone returned to DCU, changed, and then got back to Glasnevin for a reception that evening. This was marked by David Small, the Chairman, presenting a collection of Cape heath plants to the National Botanic Gardens on behalf of the Heather Society. Later, it may have been the surfeit of Capes, the wine, or simply that the stars were in a different place, one group took a very devious route back to our quarters that night. Celebrations by the Irish of sporting victories were a feature of this visit. One, that evening, led to Walter Wornick encountering an instance of real 'Irishness' when trying to get back into his room - a tale that can only be told properly by Walter!

After what was becoming our customary scramble, Sunday

morning began with the group photograph in front of the Turner glasshouse at Glasnevin. The subsequent guided tours of the Botanic Gardens, led by either Charles Nelson, or Donal Synnott, meant that delegates gained different perceptions but all appreciated its features, its trees and the heather beds. Most were staggered by the cost of re-furbishing the magnificent glasshouses to their former glory and incorporating modern technology to manage the intended displays of sub-tropical flora and Cape heaths. Some were intrigued by the vegetable trials and the infamous potato variety 'Lumper'.

Another enjoyable lunch served by the helpful staff at Glasnevin ensured we kept to our timetable, but the weather decided to interfere with a memorable thunderstorm [referred to in the Autumn *Bulletin*]. However, despite the weather, rising manholes, losing the coach and other distractions - the column of following cars managed to find their way to the place that "grew bananas & Cape heaths - located somewhere to the North of Dublin". David Robinson's fascinating assemblage of exotic plants at Howth, provided scope and vistas for all the photographers and topics for discussion by the dampened botanists and gardeners taking a tasty, filling tea laid out in his garage.

We had to hasten back for another meal, the Conference dinner. But the continual exercise, not listed in the programme, of course, ensured appetites remained. Then the entertaining finale of the customary Open Forum that tackled a series of heather problems. This was opened by presentations to the Heather Society's principal officers and our Dublin hosts on behalf of the North American Heather Society by their President, Homer Ferguson and Vice-President, Dee Daneri.

And so yet another conference came to an end. Perhaps, it was distinguished by its international flavour with so many members attending from America and other friends from various parts of Europe. All experienced the friendliness of our hosts and their fellow countrymen and enjoyed Ireland, some retaining memories of seeing familiar garden heathers growing in the wild.

Yet, to everyone, it will be remembered for the diversity and colour provided by the Cape heaths, both in Ted Oliver's words and his slides, in the unique display from Kirstenbosch, and in the living examples of *E.cruenta* and *E.glandulosa* at Howth. It will be very difficult to beat!

## CULTIVAR AND SPECIES NOTES

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### CULTIVARS REGISTERED TO 31 DECEMBER 1995

#### 131 *Calluna vulgaris* 'Florrie Spicer'

Registered 22 September 1995: Mrs W. E. S. Bamford, Haythorne Nursery, Verwood, Dorset.  
 Summer foliage yellow/green: flowers single, white with gold/chestnut anthers,  
 August to September: compact, erect habit. A seedling found in a pot of *Calluna vulgaris* 'Blazeaway' in Haythorne Nursery.

#### 132 *Calluna vulgaris* 'Sidney Spicer'

Registered 22 September 1995: Mrs W. E. S. Bamford, Haythorne Nursery, Verwood, Dorset.  
 Summer foliage yellow/green: flowers lavender (H3), single, July to August: prostrate habit. Found growing in the centre of a pot of *Calluna vulgaris* 'White Lawn' but it proved impossible to determine if it was a sport or a seedling.

#### 133 *Calluna vulgaris* 'Violet Bamford'

Registered 22 September 1995: Mrs W. E. S. Bamford, Haythorne Nursery, Verwood, Dorset.  
 Mature summer foliage yellow/green with orange-gold tips: flowers pink (H8), single, in July to August: compact, prostrate habit. Found as a nursery seedling in 1989.

#### 134 *Calluna vulgaris* 'Wendy Bamford'

Registered 22 September 1995: Mrs W. E. S. Bamford, Haythorne Nursery, Verwood, Dorset.  
 Foliage dense, in summer mature foliage yellow/green with orange/gold tips: flowers pale mauve (H2), single, July to August: semi-prostrate habit. A nursery seedling found in 1987.

#### 135 *Erica carnea* 'Branton Bamford'

Registered 22 September 1995: Mrs W. E. S. Bamford, Haythorne Nursery, Verwood, Dorset.  
 Mature summer foliage yellow/green: flower buds sparse, in racemes approximately 2 cm long towards the centres of long, trailing stems: semi-prostrate habit. A sport on *Erica carnea* 'Pink Cloud' found in Haythorne Nursery in 1992.

#### 136 *Erica cinerea* 'Brian Bamford'

Registered 22 September 1995: Mrs W. E. S. Bamford, Haythorne Nursery, Verwood, Dorset.  
 Has tufts of bract ("wheat-ears") which are characteristic of *E. cinerea* var. *rendlei*, and normal flowers. Foliage mid-green: "wheat-ears" of 12-16 deep red bracts 2.7 - 3.5mm long x 1.6-2.3mm wide, flowers, single, with normal style and stamens, corolla shading from mauve (H2) at base to amethyst (H1) at tip, calyx deep red: Upright habit, 30cm or more tall. A seedling in Ringwood Forest in 1982. Ref: *Yb Heather Soc.* 1985: 62 - 63.

**137. *Erica cinerea* 'Ogmund'**

Registered 10 October 1995: Mrs E. B. Petterssen, Otervei 16, 5045 Skjoldtun, Norway.

Open, upright habit, 20cm tall, 15-20cm spread: foliage dark green with mid-green tips in spring; pedicels and sepals dark red, corolla bicoloured, amethyst (H1) at base shading to white and back to amethyst at lobes, July to August. Found as a seedling by Mrs Petterssen in July 1993 on the island of Misje, west of Bergen, Norway. Named after her late friend, the poet Olav H. Haûge (d. 1994) who wrote "Ogmund rides home". Ogmund was a 13th century merchant-venturer from Mrs Petterssen's village who became a Crusader in Jerusalem.

**138 *Erica tetralix* 'Helen Nicol'**

Registered 1 November 1995: Robert D. W. Nicol, Stranraer, Wigtownshire DG9 OBG.

Habit spreading, 20cm tall, 40cm wide: foliage bright green: flowers single, calyx yellow, corolla white, June to August. Found as a seedling, by Mr Nicol in July 1984 at Mark Hill, Glenapp, Ballantrae, Ayrshire, Scotland, and named after his wife.

**139 *Calluna vulgaris* 'Forty-niner Gold'**

Registered 8 November 1995: Mrs R. Daneri on behalf of Col. James Thompson, P.O. Box 21, Manchester, California 95459, USA.

Habit open, erect, 40cm tall, 45cm wide: foliage lime/yellow with gold tips throughout the year: flowers single, white, in racemes up to 25cm long, from August to late October. Sport on *Calluna vulgaris* 'Long White', found in his garden by Col. Thompson in May 1991. Introduced by Heather Heaven, Humboldt County, California in 1995. Taller than other sports from 'Long White'.

## NEW AQUISITIONS

***Calluna Vulgaris*****'Bennachie Prostrate'**

Found on a mountain in Scotland by James Mackay in 1993.

Ref: *Yb. Heather Soc.* 1994:40

Light green foliage, mauve flowers, cushion forming similar to 'Mullardoch'. August to September

**'Cairnwell'**

Found in Scotland c.1970 by Magnus Ramsey of Threave Gardens.

Ref: *Yb. Heather Soc.* 1991:41

Gold foliage, prostrate, pink, August to September.

**'Erling' [new name]**

A witch's broom on 'Martha Hermann', in Sweden by a friend of Brita Johansson in 1990.

Extreme dwarf, dark green foliage; looks like a ball of moss.

**'Golden Sunrise' [new name]**

A sport from 'Sunrise' found on his nursery by John L. Jones, Glywern Nursery, Cilcennin, Lampeter, Dyfed, Wales by 1992.

Deeper gold foliage than 'Sunrise', more compact, mauve, August-September.



**'Helen Gill'** [new name]

A sport on 'Beoley Silver' found in my garden 1984 and named after my granddaughter.

Foliage grey-green with cream-tips in spring and early summer, erect habit, white flowers, September-October.

**'Johan Slegers'** [new name]

A seedling found growing near a plant of 'Sir John Charrington' by A.G. Slegers at his nursery in Holland in 1992.

Foliage yellow/orange, deeper in winter, erect habit, flowers deep violet, September to October

**'Sir Anthony Hopkins'** [new name]

A seedling found on his nursery by Nigel Sheldon, Wrenvale Nurseries, Ammanford, Dyfed, Wales, in 1993.

Foliage bright green, compact spikey growth, dome shaped, flowers very sparse, lavender.

*Daboecia cantabrica***'Alistair'**

Found by H.H. Ballantyne of Netherfeld, near Dumfries in a friends garden before 1991.

Ref: *Yb. Heather Soc.* 1993:43

Small leaves light green, flowers pale rose, July to September.

**'Glamour'** [new name]

Found by S. Ketelaar in his garden 1988, in Holland.

Foliage dark green, erect habit, flowers violet-red, July to September.

*Erica carnea***'Romance'** [new name]

Found by S. Ketelaar in a private garden in Holland in 1985.

Foliage light green, habit spreading, flowers white with slight violet blush

**'Red Shift'** [new name]

A seedling found on his nursery by John Proudfoot, Almondell Nursery, Methven, Perthshire, in 1990.

Foliage dark green with bronze tips, open habit, flowers ruby. Faster growing than 'Nathalie'.

*Erica cinerea***'May Gold'** [new name]

A seedling found on his nursery by John L. Jones, Glywern Nursery, Cilcennin, Lampeter, Dyfed, Wales, in 1993.

Foliage deep gold in spring and early summer, habit erect with curling stems, flowers deep pink.

**'Ogmund'** [new name]

Wild Seedling found by Mrs. E.B. Pettersson growing wild on the island of Misje near Bergen, Norway in 1993.

see p. 61.

**'Promenade'** [new name]

Found by S. Ketelaar in his garden 1993.

Foliage dark green, habit broad, erect, flowers robin red, June to September

**'Tessa'**

A seedling found by H. Ballyantyne of Netherfield nurseries, Dumfries.

Ref: *Yb. Heather Soc.* 1993:46

Foliage dark green, open habit, flowers purple., May to July.

*Erica tetralix***'Cons Gold'** [new name]

A sport on 'Con Underwood' found by John L. Jones, Glywern Nursery, Cilcennin, Lampeter, Dyfed, Wales, in 1993.

Green foliage with gold tips in spring and early summer, erect habit, flowers magenta.

*E. manipuliflora* x *E. vagans***'Ashlea Gold'** [new name]

Raised by Dr J. Griffiths from a deliberate cross in 1983.

Foliage deep gold, darker than 'Valerie Griffiths', erect habit, compact, flowers pink.

compiled by J. PLATT

Fern Bank, 176 Southport Road, Ulnes-Walton PR5 3LN, Lancashire

## NEW SPECIES & COMBINATIONS

*Erica*

*E. alnea* E. G. H. Oliver & I. M. Oliver, *Bothalia* **25** (1995): 90-91.

*E. amatolensis* E. G. H. Oliver, *Bothalia* **24** (1994): 123-124, comb.& nom. nov. (= *Ericinella multiflora* Klotzsch).

*E. hexensis* E. G. H. Oliver & I. M. Oliver, *Bothalia* **25** (1995): 89-90.

*E. hillburtii* (E. G. H. Oliver) E. G. H. Oliver, *Bothalia* **24** (1994): 124 comb. nov. (= *Ericinella hillburtii* E. G. H. Oliver)

*E. hispiduloides* E. G. H. Oliver & I. M. Oliver, *Bothalia* **25** (1995): 87-89.

*E. hottentotica* E. G. H. Oliver & I. M. Oliver, *Bothalia* **25** (1995): 93-94.

*E. mackaiana* Babington f. *multiplicata* E. C. Nelson, *Yearbook of the Heather Society* 1995: 40

*E. magisterati* E. G. H. Oliver & I. M. Oliver, *Bothalia* **25** (1995): 94-95.

*E. microdonta* (C. H. Wright) E. G. H. Oliver, *Bothalia* **24** (1994): 124-125, comb. nov. (= *Ericinella microdonta* C. H. Wright; syn. *E. shinniae* S. Moore, *E. brassii* Brennan; *E. microdonta* var. *craspedotricha* Brennan)

*E. paserinoides* (Bolus) E. G. H. Oliver, *Bothalia* **24** (1994): 124, comb. nov. (= *Ericinella paserinoides* Bolus).

*E. tarantulae* E. G. H. Oliver & I. M. Oliver, *Bothalia* **25** (1995): 91-93.

## CULTIVAR NAMES NEW TO THE REGISTRAR

Some of the names listed below have been formally published elsewhere in accordance with the *International code of nomenclature for cultivated plants*. Reference to those publications are cited. Most of the other names are not established as they have not been published in dated publications with accompanying descriptions as required by the *ICNCB*. **PBR** = plant breeder's rights

'Arabella'	<i>Calluna vulgaris</i>	Introduced by Kurt Kramer, Edewecht-Süddorf, Germany, by 1995; in Kramer, <i>Information über neue Heidesorten</i> , August 1995. <b>PBR</b> applied for.
'Arielle'	<i>Daboecia cantabrica</i>	Introduced by Kurt Kramer, Edewecht-Süddorf, Germany, by 1995; in Kramer, <i>Information über neue Heidesorten</i> , August 1995. <b>PBR</b> applied for.
'Ashlea Gold'	<i>E. manipuliflora</i> x <i>vagans</i>	See p. 63
'Aurora'	<i>Erica</i> [Cape heath]	Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Victoria, Australia, by 1995.
'Branton Bamford'	<i>E. carnea</i>	See p.60 [ Registered cultivars ]
'Brian Bamford'	<i>E. cinerea</i>	See p.60 [ Registered cultivars ]
'Candles'	<i>Erica</i> [Cape heath]	Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995.
'Con's Gold'	<i>E. tetralix</i>	See p. 63
'Daviesii'	<i>Erica</i> [Cape heath]	Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995.
'Dee'	<i>E. tetralix</i>	Glynwern Heather Nurseries, Cilcennin, Lampeter, Dyfed, Wales by 1995.
'Erling'	<i>Calluna vulgaris</i>	See p.61
'Florrie Spicer'	<i>Calluna vulgaris</i>	See p.60 [ Registered cultivars ]
'Fritz Kircher'	<i>Calluna vulgaris</i>	Introduced by Kurt Kramer, Edewecht-Süddorf, Germany, by 1995; <i>Ericultura</i> <b>98</b> (September 1995): 13. <b>PBR</b> applied for.
'Gengold'	<i>E. nana</i> x <i>patersonia</i>	Shown by E. G. H. Oliver at Heather Society Conference, September 1995, National Botanic Gardens, Glasnevin.
'Helen Gill'	<i>Calluna vulgaris</i>	See p. 62
'Improved Variety'	<i>E. melanthera</i>	Illegitimate; Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995.
'Lavender Mist'	<i>Erica</i> [Cape heath]	Error for <i>E. sparsa</i> 'Lavender Miss'; Mr & Mrs D. A. Phillips, by 1995.

'Mauve Hybrid'	<i>Erica</i> [Cape heath]	Rejected; Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Victoria, Australia, by 1995.
'May Gold'	<i>E. cinerea</i>	See p. 62
'Monja'	<i>Calluna vulgaris</i>	Named by H. Wordtmann, Wardenburg, Germany, by 1995. <b>PBR</b> applied for. Not established. Unknown source.
'Nocturne'	<i>Calluna vulgaris</i>	see p.61 [ Registered Cultivars ]
'Ogmund'	<i>E. cinerea</i>	In <i>Der heidegarten</i> <b>36</b> (1994): 66.
'Pink Calan'	<i>E. tetralix</i>	Rejected; Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995.
'Pink Hybrid'	<i>Erica</i> [Cape heath]	Seedling grown by John Proudfoot, Methven, Perthshire, 1989.
'Pink Lantern'	<i>Daboecia x scotica</i>	Un-named plant purchased in Denmark by Mrs. B. Johansson, Vargön, Sweden c.1980. Named by her in 1995.
'Röding'	<i>Calluna vulgaris</i>	Rejected. Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995.
'Ruby Glow'	<i>Erica</i> [Cape heath]	Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995.
'Ruby Pearl'	<i>Erica</i> [Cape heath]	Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995.
'Ruby Shepherd'	<i>E. melanthera</i>	Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995.
'Showtime'	<i>E. sparsa</i>	Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995.
'Sidney Spicer'	<i>Calluna vulgaris</i>	See p.60 [ Registered cultivars ]
'Surprise'	<i>E. melanthera</i>	In <i>The shrub and tree growers of Australia</i> , by 1995;
'Violet Bamford'	<i>Calluna vulgaris</i>	See p.60 [ Registered cultivars ]
'Wendy Bamford'	<i>Calluna vulgaris</i>	See p.60 [ Registered cultivars ]
'Wittunga Satin'	<i>Erica</i> [Cape heath]	Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995.
'Woodleigh'	<i>E. cf. subdivaricata</i>	Mr & Mrs D. A. Phillips, Ericaflora, Monbulk, Vic., Australia, by 1995; a label read "Erica persoluta rubra 'Woodleigh'" and "Erica Woodleigh Persoluta rubra hybrid" .

## CULTIVAR NAMES AMPLIFICATION and AMELIORATIONS

'White Delight'	<i>Erica colorans</i>	[Yearbook 1994: 42] Published in <i>Pelmia Rand</i> (1990): 76.
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A number of people have helped with compiling the above list by telling me of new names they had come across. I am especially indebted to David McClintock, Jack Platt and David Small.



## RECENT PUBLICATIONS

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**ANONYMOUS. 1995.** Alien invader threat to moors. *Yorkshire evening post* (12 May).

The alien moss *Campylopus introflexus* inhibits the development of heather seedlings. [DMcC]

**ANSALDI, M., MEDDA, E. & PLASTINO, S. 1994.** *I Fiore delle Apuane. Guida alla Flora di Altitudine di Parco*. Mauro Baroni editore & C.s.a.s., Genoa. ISBN 88-85408-52-4.

A description of all the plants occurring throughout the Apuane National Park. The species are grouped in colour-coded sections according to various criteria that range from flower form and colour to habitat and altitude. An introduction provides information on the region, its various environments, their characteristics and their endemic flora. Brief descriptions and references to *Erica carnea* (pp. 218-219), *E. arborea*, *E. scoparia* (pp. 300-301) and *Calluna vulgaris* (pp. 220-221). [RJC]

**ARNOLD, T. H. & de WET, B. C. 1993.** Plants of southern Africa: names and distribution. *Memoir of the botanical survey of South Africa* **62**. Pp 825.

Provides basic information about the southern African flora - the richest flora in the temperate world. A complete list of all taxa with their synonyms, important references and data on regional distribution. with codes - *Erica* is assigned computer ref. no. 6237000 (see pp. 534-547). [RJC & DMcC]

**BADMIN, J. S. 1995.** An overwintering population of *Zygina rubrovittata* ... in London. *Entomologists monthly magazine* **131**: 151-157.

This rare leaf hopper has been in great profusion in the triangular heather bed by South Kensington station. [DMcC]

**BARLOW, F. R. 1994.** *Francis Masson's account of three journeys at the Cape of Good Hope 1772-1775*. Pp 183, illustrated. Tablecloth Press, Cape Town. ISBN 0-620-18571-6. [Limited issue of 350 copies].

*Erica massonii* commemorates this botanical collector who was sent out by Kew. Various references to *Erica* species that he introduced into European gardens. Also includes material on other places Masson visited, for example the Azores. [ECN]

**BENNETT, M. 1995.** White heather as a wedding flower. *Plant lore notes and news* **39**: 190.

Extract from her book *British customs from the cradle to the grave* (1992, p. 123). [DMcC]

**BONNARD, B. 1993.** *Channel Island plant lore. Herbal remedies, folk lore and legends, superstitions and beliefs*. Guernsey Press, Guernsey. Pp 70.

References to heathers are limited to the local island names for *Erica tetralix*, *E. cinerea* and *Calluna* (p. 58), all of which appear to be similar with some terms being used regardless of species.

**BROWN, N. A., KOTZE, D. & BOTHA, F. A. 1995.** The promotion of seed germination of Cape *Erica* species by plant-derived smoke. *Seed science and technology* **25**: 573-580.

25 out of 40 species showed improved germination, some up to 8100% [DMcC]

**BROWN, N. A., BOTHA, F. A. & PROSCH, D. 1995.** The benefits of smoke in germinating South African shrubs. *The garden* **120**: 402-405.

39 *Erica* listed and 2 illustrated. [DMcC]

**BUZACKI, S. 1994.** Heathers and conifers. *Your garden* (December): 8-12.

Standard stuff with old cultivars. [DMcC]

- BURTON, R. 1994.** Local wild flowers in Kent. *Calluna vulgaris*. *South London Botanical Institute gazette* (November): 1.  
Much decreased in the county; best at Farningham. [DMcC]
- BURTON, R. M. 1995.** A new locality for *Erica bocquetii*. *Karaca Arboretum bulletin* 3: 27-29.  
The second place for this Turkish endemic. [DMcC]
- CAPERN, S. J. M., RISAGER, M. & LEA, J. M. 1994.** Effects of nitrogen supply on frost hardiness of *Calluna vulgaris*. *New phytologist* 128: 461-468.  
The effect can be rapidly and accurately assessed in the laboratory by analysis of excised shoots. [DMcC]
- CLEMENT, E. J. & FOSTER, M. C. 1994.** *Alien plants of the British Isles*. Botanical Society of the British Isles, London. Pp xviii, 590.  
Entries for *Erica arborea*, *E. carnea*, *E. x darleyensis*, *E. lusitanica*, *E. terminalis* (p. 115).
- CRONK, Q. C. B. & FULLER, J. L. 1995.** *Plant invaders*. Chapman & Hall, London.  
*Calluna* invading New Zealand (p. 143), *Erica lusitanica* in New Zealand (p. 155-156). Seed bank up to 480,000 per sq. metre. [DMcC]
- DAFNI, M. 1994.** Note on side advertisement in flowers. *Functional ecology* 8: 136-138.  
Tests on 99 South African *Erica* on the attraction to pollinators of the 'side view' of a flower. [DMcC]
- DOWNHAM, F. 1994.** Cold weather heathers. *Amateur gardening* (26 November): 12.  
*Erica carnea*, *E. x darleyensis* and a very dull 'Top Ten'. [DMcC]
- ENGLISH NATURE. 1995.** *National lowland heathland programme*. English nature (Publication no 21). Pp 14.  
Information and articles on the various projects to restore and manage lowland heathland with which English Nature is currently associated. These include the restoration of the Greenham Common USAAF air-base, Berkshire, to the heathland habitat that existed prior to 1942; management of the NNR at Thursley Common, Surrey; the future of the Brecklands; the restoration of Black Park, near Slough; trials of machinery to strip turf in order to expose bare ground; and progress in establishing a NNR on the Humberland peatland workings. [RJC]
- EVERETT, D. 1995.** Heather gives interest to parterres. *Country life* (16 March): 71.  
Describes her heather parterres with two telling photographs. [DMcC]
- FELTWELL, J. 1995.** *The conservation of butterflies in Britain, past and present*. Wildlife Matters, Battle; The Chameleon Press, London. Pp ix, 230, [iii]. ISBN 0-907970-02-8  
A history of the conservation of butterflies. Ecological issues are considered and there are brief reference to heathland, *Erica cinerea*, *Calluna vulgaris* in discussion of threats to heathland habitats and particularly the plight of the Silver-studded blue butterfly on a site in Suffolk. [RJC]
- FERMAN, D. M. M. & McADAM, G. H. 1994.** Seed bank in stands of heather moorland. *Irish naturalists' journal* 24: 480-483.  
'Most striking was the stability of the existing *Calluna*.' Based on work at Ballycastle, County Antrim. [DMcC]
- FITZGERALD, C. 1995.** Common sense. *Yorkshire evening post* (2 May).  
Defence of the treatment of Skipwith Common, to preserve its heather. [DMcC]
- GENT, G., WILSON, R. et alii. 1995.** *The flora of Northamptonshire and the Soke of Peterborough*. Kettering & District Natural History Society; Robert Wilson Designs, Rothwell, Northants. Pp 335. ISBN 0-907381-03-0; 0-907381-08-1.  
A comprehensive reference to the flora from earliest record to the situation at the present time. 'Heathland is lacking as very few acid soils occur.' Consequently, brief references to *Calluna*, *Erica cinerea* and *E. tetralix* either 'rare' or 'very rare'. [RJC]

- GOLDBLATT, P. & JOHNSON, D. (eds.) 1994.** Index to plant chromosome numbers 1990-1991. *Monographs in systematic botany of Missouri Botanical Garden* **51**.  
Some Ericaceae listed (pp. 88-89), *Calluna vulgaris*; *Erica scoparia* subsp. *scoparia*; *Gaultheria* spp.
- HARPUR, M. 1995.** Moors melodies. *Cara* **28** (1): 16-19.  
Tourist promotion, with photograph of *Calluna* which 'ends up in Scandinavia, for blood filtration! When it's saturated they chop it up and use it for fertilizer.'
- HARRINGTON, R. & STORK, N. E. (eds.) 1995.** *Insects in a changing environment*. 17th symposium of the Royal Entomological Society of London, September 1993.  
Heathland and moorland mentioned in various contexts: the constraints imposed by the effects of 'habitat fragmentation' (p. 19); the threats to these habitats of beetles and butterflies (pp. 337-338); to studies of ground beetles and their value as indicators of land-use (pp. 413-414). [RJC]
- HOPKINS, J. J. 1995.** The habitats directive - Selecting the U.K. sites. *British wildlife* **6**: 297-306.  
A general introduction to the European Community legislation for the establishment of a series of protected sites selected for their habitats or species (SACs) with intended timetable for its implementation; this is preceded (pp. 286-296) by an alphabetical list of possible sites in the UK. Among the list of Priority habitats are: 31.12 Southern Atlantic wet heaths with *Erica ciliaris* and *E. tetralix*; 31.234 Dry coastal heaths with *E. vagans*. The Lizard is listed with a photo of Cornish heath above Kynance Cove (p. 306); Thursley, Surrey is listed as a 'North Atlantic' wet heath. [RJC]
- HUTSON, L. 1995.** Plant profile. *Erica*. *Your garden* (May): 67.  
Advice for window boxes [DMcC]
- HYAM, R. & PANKHURST, R. 1995.** *Plants and their Names. A concise dictionary*. Royal Botanic Gardens, Edinburgh & Oxford University Press, Oxford. ISBN 0-19-866189-4.  
Reference work to common and scientific names with their derivation. *Calluna* (p. 83), *Erica* (pp. 177-178), Ericaceae (p. 178).
- ISAACSON, R. T. 1995.** *Flowering plant index* 3 (No. 1). University of Minnesota.  
Lists pictures in colour of taxa including cultivars: *Andromeda* (p. 18), *Calluna* (p. 47), *Daboecia* (p. 88); *Erica* (pp. 113-120, largely South African by Schumann). (See also *Yearbook* 1994: 50.) [DMcC]
- JOHANSSON, B. 1995.** Ljung. *Hemträdgården* **4**: 21-22.  
Excellent account of *Erica carnea* cvs, with two striking photos of them in her garden. [DMcC]
- JOHANSSON, R. & LINDAU, A. K. E. 1995.** *Ville Blomster i Skog og Mark*. Oslo, 1995.  
Two pages each for *Andromeda* (p. 412), *Calluna* (p. 38), *Erica tetralix* (p. 414 with distribution maps for all Scandinavia; no *E. cinerea*). [DMcC]
- JØRGENSEN, P. K. 1995.** De flotteske Lyng - de hjemmelavede. *Haven* **6/7**: 336-337.  
Propagation [DMcC]
- JUNIPER, T. 1994.** Comment: Conservation on the global stage - the Habitats Directive, the Biodiversity Convention and the U.K. *British wildlife* **6**: 99-103.  
Photographs (colour) of Caledonian Forest at Rothiemurchis (p. 100, *Calluna* in foreground) and of cross-leaved heath with lichens and bryophytes at Flanders Moss, Scotland (p. 102), one of the largest sites of primary raised-bog in the U.K. [RJC]
- KEITH, L. B. 1994.** Heather moorland regeneration: the government initiatives. *The Heather Trust 10th annual report*: 29 & 31.  
The joint management of grouse and grazing animals.
- KELLY, J. 1995.** Ericas. *Amateur gardening* (8 April): 23-29.  
A standard survey with poor photos [DMcC]

- LAURENCE, I. 1994.** *A guide to the wild flowers of Cleveland. A comprehensive flora of the county of Cleveland.* Cleveland County Council. Pp 174.  
Numerical catalogue of species in the county and brief information on occurrence. Limited information on Ericaceae (ling, cross-leaved heath & bell heather (pp. 100, 399, 400); *Pernettya mucronata* [sic] (p. 99) one record in birchwood, Lazenby; *Vaccinium vitis-idaea*, *V. myrtillus*. [RJC]
- LUTEYN, J. L. (ed.) 1995.** *Flora neotropica.* Monograph 66. Ericaceae Part II. The superior-ovaryed genera (Monotropioideae; Pyroloideae; Rhododendroideae; Vaccinioideae p.p.) New York Botanical Garden, New York. Pp iii, 560, [v].  
18 genera, 155 species of Ericaceae with superior ovaries that occur in the Neotropics; introduction by P. F. Stevens, 'Familial and interfamilial relationships', provides valuable summary of the taxonomic history of the Ericaceae. [RJC]
- McCLINTOCK, D. 1995.** Erstbeschreibung auf Lateinisch, *Erica x oldenburgensis*. *Deutsche Baumschule* 5: 198.  
The formal description of the hybrid *Erica arborea x carnea*. [DMcC]
- McDONALD, D., JURITZ, J. M., COULING, R. M. & KNOTTENBELT, W. J. 1995.** Modelling the biological aspects of local endemism in South African fynbos. *Plant systematics and evolution* 195: 3-4.  
'E. G. H. Oliver provided valuable information on endemic Ericaceae.' [DMcC]
- MARREN, P. 1994.** *England's national nature reserves.* T. A. & D. Poyser, London, in association with English Nature. Pp xxii, 272. ISBN: 0-85661-083-6  
(See *Bulletin of the Heather Society* Summer 1995: 15-17). Three of the excellent colour photographs feature heaths. [RJC]
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All material for the 1997 issue of the *Yearbook of the Heather Society*  
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31 October 1996

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